

Tracking the Russian Flu in U.S. and German Medical and Popular Reports, 1889-1893

Final Report

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Evening World (New York, NY, December 18, 1889, p. 1

<https://chroniclingamerica.loc.gov/lccn/sn83030193/1889-12-18/ed-4/seq-1/>

Summary

Tracking the Russian Flu examines the ways that the digital humanities can enhance historical analysis in terms the availability of digitized source materials, the potential for large-scale text analysis, and the application of computational methods. A case study of the Russian influenza epidemic allows for close examination of original source materials (newspapers and medical journals) that tracks the disease, and reporting about the disease, at global, regional, and local levels across time. The project begins with the first notifications of unusual levels of sickness in St. Petersburg, the capital of Russia, in late November, follows the remarkable increase in reporting as the disease spread across Europe, over the Atlantic to the United States, and then globally. Although the sudden spike in deaths at the peak periods of the epidemic quickly returned to normal, which was followed by corresponding decreases in newspaper reports, the death toll from influenza remained high through the early 1890s. Part I of this report / white paper is a case study of reporting in one newspaper, New York City's *Evening World*, and one journal, the *New York Medical Record*, using publicly accessible sources, tools, and methods. Part II uses published research and presentations completed over the course of this project to explore a broader range of sources, tools, and methods that suggest the possibilities, as well as the limitations, of applying digital humanities tools to enhance historical analysis. The final section, Project Evaluation, reviews the accomplishments of the project and identifies steps for further exploration, analysis, and dissemination.

Part I: Reporting the Russian Influenza: A Case Study

On December 18, 1889, the front page of the *Evening World* featured a cartoon and an article about the spread of a new global disease, under the headline: “La Grippe’s Score: More Victims of the Dreaded Russian Influenza.” The headline itself offers a striking interpretation of the meaning of this disease: two terms, “score” and “victims” suggest that the impact of the epidemic could now be measured in some meaningful way. The adjective, “dreaded” before “Russian influenza” further reinforces the sense that this disease was a significant threat. Referring to the “Russian influenza” indicates that this geographical designation had become recognizable for American newspaper readers. Finally, the fact that the headline refers to both “grippe” and “influenza” suggests that these two terms were used to refer to the same disease. By contrast, the cartoon published immediately above the headline seemingly strikes a different tone, as the caption, “Hear Us Sneeze,” does not suggest a serious threat (Illustration 1). The four men who appear in front of the buildings are clearly in distress (all are engaged in some form of sneezing) but seemingly otherwise in good health and not in any immediate threat. The article’s headline and the cartoon thus signified that this disease was now part of the information network that connected the United States and Europe.

The *Evening World* is an excellent newspaper to use for this case study because it was published in the largest city in the United States, which was located on the eastern coast and thus in the region first affected as the Russian influenza crossed the Atlantic. The *Evening World* is available in digitized form from *Chronicling America*, which means that it can be accessed by scholars and students anywhere in the world without a subscription or other restrictions. A close reading of this text, using traditional humanities methods, is thus a way to introduce both the Russian influenza and the goals of this project.

The article itself provides conflicting information about the severity of the disease. The first sentence emphasizes how local knowledge of the disease among medical experts had quickly changed: “It is pretty safe to say that almost every physician in New York is today more conversant with the symptoms and phases of the Russian influenza than he or she ever was before.” The sentence suggests that as physicians dealt with patients reporting symptoms associated with this disease, the physicians’ practical understanding of the disease (as defined by the shorthand term, “conversant”) would become more detailed, personal, and functional. The phrase, “was before” is surprising, given that the Russian influenza had only been reported a couple weeks earlier. The use of the phrase, “he or she” is quite remarkable in the context of 1890. At a time when the medical profession was overwhelmingly male, the use of gender-inclusive language is strikingly modern. Most importantly, this sentence highlights how knowledge of influenza changed in spatial terms from spatially distant to locally available and in qualitative terms from second-hand reporting to first-hand observations.

These patterns continue as the newspaper reported on individual victims which included symptoms as well as explanations for how the disease was being transmitted across distances and among individuals. The cases in family of Mr. Klamroth, on East Forty-sixth street, “by general agreement are conceded to be identical with those of the dreaded La Grippe, and evidences multiple that it is infectious.” W. B. Wheeler, a broker living at Windsor Hotel, “is a victim of the disease.” Although his case has not been reported to the Board of Health, his physician, Dr. Thomas H. Allen, “identifies all Mr. Wheeler’s symptoms as those of the influenza.” An unnamed “gentleman” who arrived from Europe on the “Red Star Line steamship” the previous week “has lain ill for four days” in his Twenty-first Street residence “with an undoubted case of La Grippe.” The article then provided further details that connected this

victim to the agent of information circulation, a newspaper reporter, who himself became part of the story even as he reported it: “An Evening World reporter, who is a personal friend of the sick man, called to see him Sunday, and Monday he was attacked with the same symptoms.” This sentence is suggestive of three important features of the information network related to the Russian influenza: first, newspaper reporters were also people, not just nodes in a network, and their agency was part of this history; second, personal connections mattered, including friendships but also the familial relationships suggested above in the reference to the Klamroth family; and third, referring to “the same symptoms” makes the disease seem more real and specific, thus contributing to the overall message of this article that this disease is in transition from a distant reported story to an immediate lived experience.

The next paragraph of the article adds a historical perspective but also explains how the disease affected different age groups, relative numbers of the population, and humans as well as animals: “It is interesting, though not particularly reassuring, to know that in a precisely similar epidemic in Europe in 1847-8 about one-fourth of the population were affected. Adults were the principal sufferers, children generally escaping, even in the families of those stricken. In Paris the proportion of the adult population affected was twice as large as in London. The disease often attacks domestic animals and horses as well as human beings.” Certain elements of this statement are medically accurate: humans and animals can be infected by influenza, although the disease is generally not communicable across species once it has left the waterfowl hosts. Influenza infection rates in a significant epidemic event can reach one-quarter of the population, with much smaller proportions becoming significantly ill or dying. Although children can fall ill with influenza, the effect on adults is probably more visible, as they miss work or otherwise disrupt public life. The relative rates for London and Paris are difficult to evaluate but they do show that for an American newspaper, these two large European cities are meaningful points of comparison. Finally, the first part of this paragraph, the statement that this historical and medical perspective is “interesting, though not particularly reassuring,” suggests how the newspaper understood readers might respond emotionally to what appears to be factual information about the disease and its anticipated effects on individuals and society.

Returning to the current epidemic situation, the article included this observation: “It is said that in the present epidemic nearly 40 per cent of the adult population of Russia have been set to sneezing.” This observation combines a statement of the scope and impact of the disease -- nearly half the people of the city are affected by the disease -- yet also undercuts any real sense of danger by suggesting that “sneezing” was the only real effect on people. This reassuring message continues in the article’s statement that New York’s climate, which is similar to Paris and London, and the current weather “are favorable for a general sneezing season.”

The article concludes with a statement from the regional medical expert, Dr. Cyrus Edson referring to possible actions by the Board of Health as well as individuals: “If the disease threatens to become epidemic, it will then be time for the Board to act. For the present the Board has all it can do to combat contagious diseases of a more dangerous nature, such as scarlet fever. As a preventive of influenza I would recommend people to eat good food and avoid all unhealthful surroundings.” The statement from Edson introduces the perspective of an expert into the newspaper reporting, and the reference to “epidemic” and “contagious diseases” is certainly an escalation in the language used to report on this disease. Yet the effect of Edson’s statement is to reinforce the sense that influenza is less of a threat than “contagious diseases of a more dangerous nature, such as scarlet fever.” Even though Edson is

a physician and public health official in the largest city in the country, his advice for preventing influenza seems like simple common sense: “eat good food and avoid all unhealthful surroundings.”


This close reading of a single article offers several important insights into the project goal of “tracking the Russian influenza” in terms of information and disease flow. A reader of this article in mid December 1889 could acquire significant information about the disease, including evidence that it had reached the United States and specifically New York City, that influenza had a long history and often infected large proportions of populations, and that experts in the city, including many physicians as well as the chief medical officer, were paying attention to the number of victims and the range of symptoms, but these experts were not overly concerned about the actual impact of the disease. The reader would know, or would learn, that Russian influenza and gripe were synonyms, referring to the same disease, which combines established knowledge about this disease with awareness of the fact that the recent outbreak was associated with a specific foreign country. Yet a close reading of this article does not address key questions of how widely this information was being disseminated, how the reporting changed before and after this specific report, and to what extent the patterns evident in this one article were replicated in other kinds of reporting.

Addressing these questions of the breadth of reporting and changes over time requires the capacities of digitized source materials and the application of computational tools to understand the broader context of disease reporting during this epidemic. Chronicling America has strong search capacity, including the possibility of searching for combinations of keywords, limiting searches by title or state, and setting time limits. For the purposes of this project, two key words, influenza and gripe, provide the most extensive (but not exhaustive, as discussed below) evidence of reporting on this epidemic.

On December 18, 1889, the day that the Evening World published a front page article and cartoon about the “Dreaded Russian Influenza,” the keywords gripe or influenza appeared in 32 newspapers in the Chronicling America database (Illustration 2). The search mechanism highlights the relevant terms, and makes it possible to sort by relevance (the number of times the words appear on a page relative to the total number of words on the page), date, newspaper title, and state where the newspaper was published.

These titles were distributed broadly across the United States, as shown in Illustration 3. While this map indicates where newspapers did report on this disease, it does not provide a comprehensive record of reporting because the Chronicling America collection is both incomplete and inconsistent. Minnesota and New York, which had three newspapers reporting on the disease on this one day, have many newspapers in this collection, whereas many states have only limited representation. Recognizing how digitized collections represent only a portion of the historical record, and more importantly how the representation of newspapers is a product of recent, rather than historical factors, is an essential step in using digital humanities methods for historical research.

Expanding the date parameters does allow for a broader sense of how widely American newspapers reported on this disease as its arrival was anticipated in this country. During the week that began on Sunday, December 15, 1889, and thus included the December 18 reports cited above, the Chronicling America collection includes articles from newspaper titles more broadly distributed across the country (Illustration 4):

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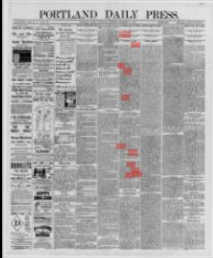
All states + from 1789 to 1789 + enter one or more search words **GO**

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Results 1 - 20 of 46 | 1 | 2 | 3 | **GO** **View:** Gallery | List

46 results containing "influenza OR grippe"


☐ Show only front pages Sort by: **Relevance** Results per page: **20**




The Portland daily press. (Portland, Me.), December 18, 1889. Image 1




The evening world. (New York, N.Y.), December 18, 1889, LAST EDITION. Image 1




The sun. (New York [N.Y.]), December 18, 1889. Image 1




The daily citizen. [volume] (Asheville, N.C.), December 18, 1889. Image 2




Evening star. [volume] (Washington, D.C.), December 18, 1889, Page 6. Image 6



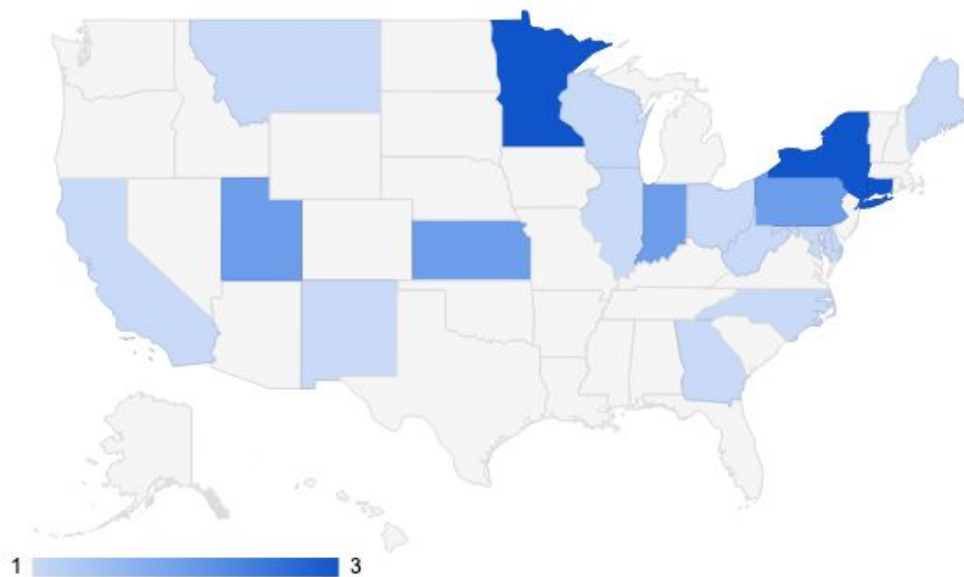
The evening world. (New York, N.Y.), December 18, 1889, SPORTING EXTRA. Image 1

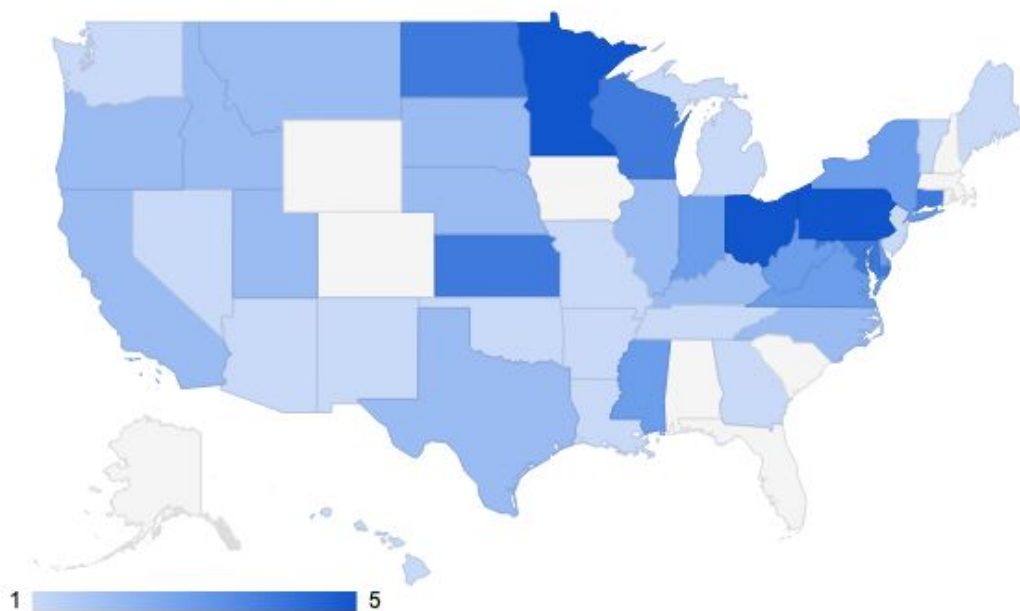


The evening world. (New York, N.Y.), December 18, 1889, EXTRA 10 O'CLOCK. Image 4



Santa Fe daily New Mexican. [volume] (Santa Fe, N.M.), December 18, 1889. Image 1






Once again, states with relatively high number of newspaper titles reporting on the disease, including four or five titles in Pennsylvania, Kansas, and Ohio, is reflective more of how newspapers are added to the digital collection than the actual coverage of the disease. The absence of reports from Massachusetts and Iowa is similarly reflective of the relatively small number of titles from these states in this digital collection. The fact that 91 newspapers from 41 different states did report on this disease during the week that it first arrived in the United States is the important analytical statement that can be made based on this evidence.

Digitized newspaper collections also facilitate efforts to track reporting across time. The four months from December 1, 1889 to March 31, 1890 encompasses the first reporting on the disease by this term, on December 13, through the spike in deaths in New York City in early January, and ending with monthly reports on mortality figures for February. During this period, *Chronicling America* reports 249 pages in this one newspaper that included one or both terms. Illustration 5 shows these results sorted by relevance, with orange boxes marking the presence of these terms.

In the case of the *Evening World*, however, these results need further cleaning, because the multiple editions of this newspaper are preserved in this database, so the front page of the December 28, 1889 issue appears as both the “EXTRA 2 O’CLOCK” edition and the “LAST EDITION.” Because the *Evening World* was published in multiple editions, all of which are digitized and including in the *Chronicling America* collection, the total results for a keyword search can be deceptive, as multiple issues from the same day will count as multiple results. In addition, *Chronicling America* counts results by pages, regardless of whether a term appears once, twice, and many times on the same page. The 249 total results for these four months thus need to be analyzed critically, and using multiple tools, in order to determine how much the coverage actually changed in this single newspaper. Of the 108 issues published over these four months, 58% included some reference to either influenza or gripe. During the peak period of reporting, the six weeks that lasted from December 15, 1889 to February 8, 1890, 94% of the issues of *Evening World* included the term influenza or gripe.


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All states + from 1789 to 1789 + enter one or more search words **GO**


Pages Available: 15,211,784 Print Subscribe Share/Save Give Feedback

Results 1 - 20 of 249 1 | 2 | 3 | ... | 11 | 12 | 13 Jump to page: **GO** View: Gallery List


249 results containing **"influenza OR gripe"**
☐ Show only front pages Sort by: Relevance Results per page: 20




The evening world. (New York, N.Y.), December 28, 1889, EXTRA 2 O'CLOCK, Image 1




The evening world. (New York, N.Y.), December 28, 1889, LAST EDITION, Image 1




The evening world. (New York, N.Y.), January 11, 1890, SPORTING EXTRA, Image 1




The evening world. (New York, N.Y.), January 03, 1890, LAST EDITION, Image 1




The evening world. (New York, N.Y.), January 07, 1890, LAST EDITION, Page 4, Image 4



The evening world. (New York, N.Y.), January 04, 1890, EXTRA 2 O'CLOCK, Image 3



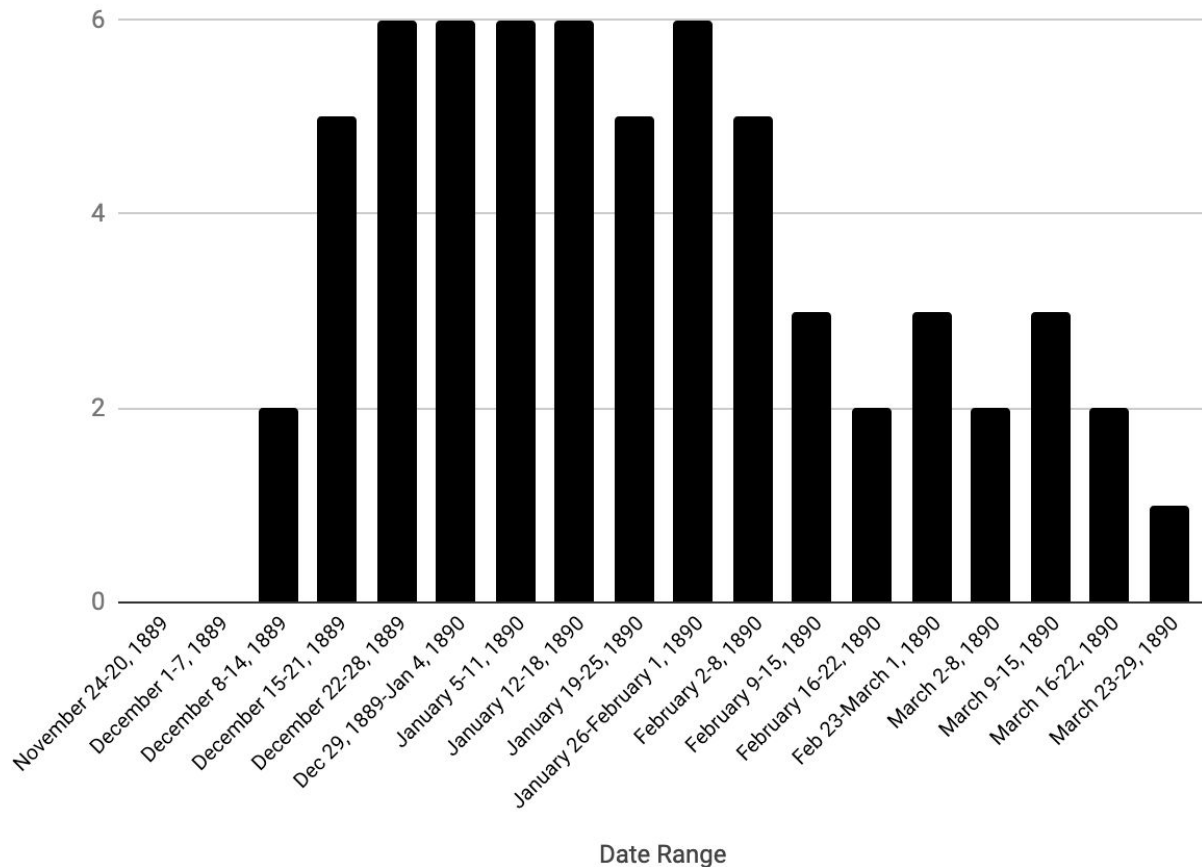
The evening world. (New York, N.Y.), January 08, 1890, LAST EDITION, Page 4, Image 4



The evening world. (New York, N.Y.), January 03, 1890, EXTRA 2 O'CLOCK, Image 1

Sorting the results by date thus provides a more accurate gauge of how the frequency of reporting in this newspaper changed during the course of this epidemic (Illustration 6). The increased coverage in late December, the peak reporting from late December through early February, and the gradual declines from late February through March indicate how the information flow about the influenza anticipated, and then followed, the actual spread of the disease as it reached the United States. The Evening World was published six days a week, Monday to Saturday, so during five of the weeks in this period, either influenza or gripe appeared in every issue of the newspaper during the week.

Evening World, Days with Keywords Influenza or Grippe



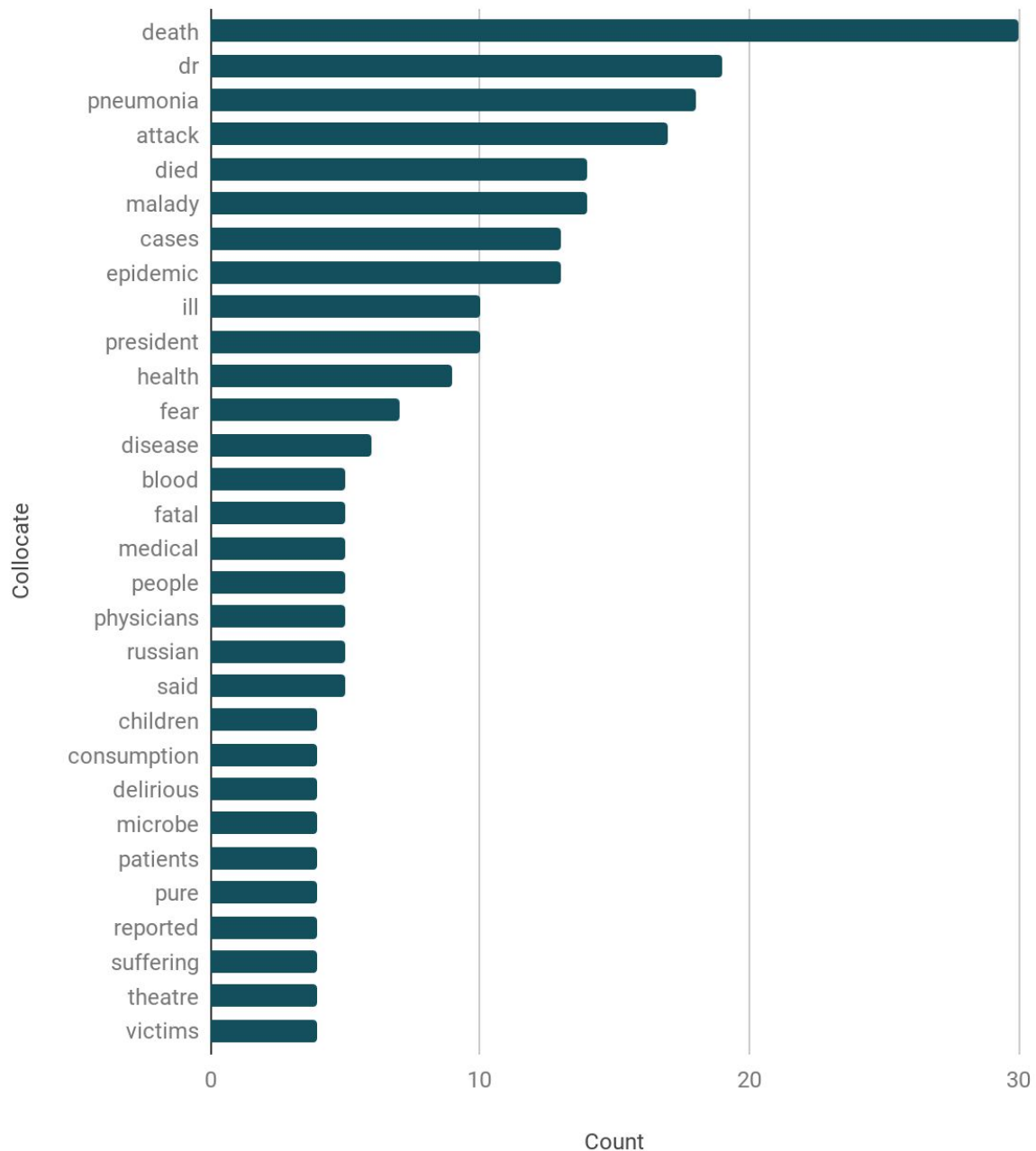
Understanding the changing frequency of reporting can be pursued using [Voyant](#), a public tool for text analysis. The collocation and context tools are most useful for examining large amounts of text over a period of time or across a range of publications. Each four page issue had about 30,000 to 40,000 words. One week of the newspaper has nearly a quarter million words, on average. The collocation and context tools are most useful for examining large amounts of text over a period of time or across a range of publications. Each edition of the newspaper can be visualized using text version of the newspaper. These urls can be copied and pasted into Voyant, or each newspaper issue can be downloaded as a txt file and then uploaded into Voyant. An analysis of each month, from December 1889 to March 1890, provides the following distribution by day. In contrast to *Chronicling America* results, by page, these results actually indicate the number of times each key word appears in a newspaper issue. While the pattern is generally the same as the weekly results shown in Illustration 7, the more extensive data from Voyant allows for more granular analysis of reporting frequency:

[illegible]

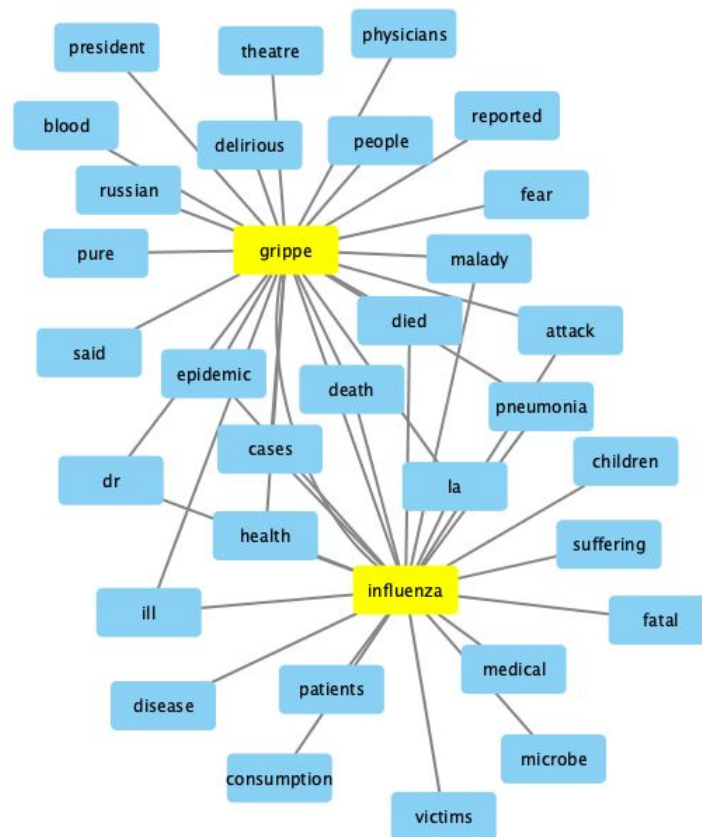
While the cirrus cloud and bubbles (top left and bottom left) are useful for visualizing the frequency of terms, they do not provide much analytical value. By contrast, the collocation and context tools (top right and bottom right) provide the basis for more effectual analysis over large amounts of text because they make it possible to interpret the meaning, in addition to the frequency, of these keywords in context.

Illustration 9 shows thirty medically significant terms that were collocated most frequently within 15 words before or after the keywords “influenza” and “grippe” in the eight weeks of peak reporting, from December 15, 1889 to February 8, 1890. Several of the most common terms suggest that the disease were perceived as threatening: death and died appeared relatively frequently. Other frequently appearing terms are specific to medical conditions: cases, malady, ill, health, and disease,

Evening World, Dec 89 to Feb 90, Collocates with Influenza or Grippe



The relationship between collocated terms can be revealed using a network diagram created with Cytoscape, a free tool that can be downloaded by users (Illustration 10). This diagram indicates which terms appeared more frequently in proximity to both *grippe* and *influenza*, such as epidemic, death, died, cases, and pneumonia. The diagram suggests that more specifically medical terms, such as microbe, patients, and consumption (tuberculosis) were more likely to be associated with *influenza*, whereas more general terms, such as look, delirious, or fear, were associated with *grippe*. Yet any interpretation of these associations must be based on more extensive collections of texts and more thorough and recursive data analysis. According to this diagram, for example, the work “russian” appears more frequently in proximity to the term *grippe* than to *influenza* -- yet the phrase, “Russian influenza” was a common way to refer to this epidemic.



Research using large scale textual analysis is dependent on the availability of digitized source materials as well as the quality of the digitized texts. The historical of the December 17 article uses the image of the actual page for the purposes of analysis. In this way, the historian is able to read on a screen the exact words that were available to a newspaper reader in December 1889. By contrast, the text version of this newspaper, which is read by the search algorithms and by any computational methods, is so full of errors that is almost incomprehensible. Illustration 11 is a screen shot indicating the three instances where

“grippe” was spelled correctly (yellow), all the words that were spelled incorrectly in the ocr version (blue), and the three instances where “influenza” was spelled incorrectly (green). The latter information is particularly important because these terms would not be discovered through a keyword search for a common disease term such as “influenza.”

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Using digitized texts such as newspapers and journals for historical analysis requires an integrated approach that uses tools and methods to advance understanding of the past. Part I of this report explores publicly available sources (American newspapers in Chronicling America) and tools (spreadsheets and visualization tools) in combination with traditional forms of close reading. These tools and methods are widely accessible to students, scholars, and the public, thus demonstrating how new approaches in the digital humanities can serve as a model for scholarly research.

Part II: Research Outcomes

The research published, posted, and presented during the grant period documents how the tools, sources, and methods of the digital humanities can advance historical inquiry. This section provides brief summaries of these works to illustrate how they engaged the goals of the project, resulted from interdisciplinary collaboration, and advanced methods in the digital humanities.

Comparing Popular and Medical Reporting

This project has focused on the relationship between expert and popular reporting during the Russian influenza through several case studies that have focused on doctors, medical journals, and newspaper reporting. An article published in *Medical History* co-authored with two undergraduate researchers examined the role of Dr. Bartholow, a Philadelphia physician, whose intervention in the early stages of the epidemic was widely circulated (but also contested) by newspapers across the United States (1). A research posting for the Medical Heritage Library, co-authored with the same two undergraduate researchers, explored the similar role of Dr. Shrady, a New York doctor and journal editor, whose observations on the epidemic reflected the growing sense of alarm about the potential impact of the disease on the United States (19). The local relationship between expert and popular reporting is explored in more detail in an article published in *Medical History* which compares the Detroit Free Press, a local newspaper, and Medical Age, a monthly medical journal published in Detroit (2). An article in the second volume of *Current Research in Digital History* examines how a Russian doctor, Zdekauer, set off a major deliberation in both medical journals and popular newspapers over the possible relationship between influenza and cholera (3). As the article explains, the controversy was prompted by an abbreviated reference to a statement Zdekauer made at a public health meeting in St. Petersburg in November 1889. Tracing the discussion of his statement across global newspapers, while also following how the Russian press and Zdekauer himself responded to these reports, provides further evidence of how the spread of information was shaped by expert knowledge, popular reporting and new technologies. A Scottish doctor, Frank Clemow, also occupied a transnational role, as he observed the start of the epidemic from his post at the Seaman's Hospital in Kronstadt, Russia, in fall 1889, and then reported on the disease for the next three years. The impact of this individual recorder and reporter was explored in a presentation at Edinburgh University, as part of a colloquium on epidemic reporting (5).

The *British Medical Journal* occupied an important role in the information networks that shaped reporting on the Russian influenza. As one of the world's leading sources for expert medical knowledge, this journal was highly respected and widely cited at every stage of the influenza epidemic. In addition, the *British Medical Journal* reported widely on the disease outbreak, starting with the first reports from a correspondent in Russia and culminating in extensive reports on mortality in major cities in Europe. Finally, the *British Medical Journal* provided extensive and detailed reporting from across the United Kingdom, thus providing highly granular information about the disease. A presentation made at Manchester University tracked reporting in the British Medical Journal as a way to visualize the spread of information as well as disease across Europe, the United Kingdom, and the world. Using the text files of the British Medical Journal, a team of undergraduate completed three posts that appeared in Circulating Now, the blog from the History of Medicine Division of the National Library of Medicine, that explored visualization tools for examining large amounts of text in this journal (18).

Both the information flow and disease transmission can be analyzed productively as networks. Influenza is a contagious disease, communicable among people primarily through respiration. Although some doctors and perhaps a large share of the public continued to believe in some form of a "miasmatic" explanation, the trend within the global medical community was toward seeing influenza as yet another disease transmitted through some form of microbes. To the extent that both expert knowledge and popular opinion understood that the disease was transmitted by and among people, it made sense to think in terms

of how networks may transmit this disease. In the Evening World article analyzed above, for example, the unnamed victim was connected to three potential networks of disease transmission: first, his recent experience traveling in Europe; second, spending several days on the trans-Atlantic journey by ship; and third, his friendship with an Evening World journalist. Yet influenza was also situated in extensive and complicated information networks, including professional associations of physicians, medical journals, and newspapers, each of which functioned at global, national, regional, and local levels. A presentation at a workshop on digital humanities and network analysis, which is now an article under review for a journal, examined the ways that a Connecticut physician was situated at the intersection of both disease and information networks. Using digitized newspapers from New Haven, collections of vital statistics, and articles from the Connecticut medical association, the presentation and article examined the ways that digital humanities sources, tools, and methods can enhance historical understanding (7, 9).

A study of newspaper reporting in Washington DC explores the role of journalists in shaping the flow of information about the disease as it transitioned from a global (and thus distant) to a local (and thus immediate) health event. A close reading of articles in one Washington newspaper, *Evening Star*, argues that the agency of the journalist (who remained unnamed in every story) shaped the reporting through both the selection of evidence and the narrative framing of the disease. Initially a presentation at a workshop on Observing the Everyday, this study has now become a chapter accepted for publication in an edited volume on journalistic practices in historical settings (13, 20).

Comparing Information Flow to Disease Outcomes

The topic of the Russian influenza is well suited to an exploration of the relationship between the spread of information and diseases because the epidemic occurred at a time when medical experts and government officials believed that counting victims could contribute to improvements in public health. Throughout this project, the research team has been using this data to explore the relationship between the experience of the disease and the patterns and practices of reporting on the disease. These statistics were published in volumes, reported in medical journals, and summarized in newspapers, further illustrating the important relationship between expert and popular reporting during the epidemic. In the United States, the disease occurred within the period, from June 1889 to May 1890, used to compile the vital statistics for the 1890 Census. This coincidence in timing is the basis for an article published in the medical journal, *Influenza and Other Respiratory Diseases*, examining statistical evidence and newspaper reporting in Indiana during the epidemic (4). A presentation with undergraduate researchers at the National Library of Medicine (NIH) compared the reporting on deaths in Berlin in the early weeks of the epidemic with the vital statistics published in German newspapers and medical journals. In addition to this published article, similar case studies are in preparation for other states as well as international comparisons for Europe, the United States, and other parts of the world (11, 12, 14).

As part of the analysis of how reporting related to actual death rates, several students working on this project examined newspaper in both the United States and Germany and medical journal articles from various countries about the death rate in Berlin during the early phases of the epidemic. Berlin was a significant location during the influenza epidemic because it was one of the major cities affected as the epidemic spread westward from Russia, and so it received considerable attention from international newspapers. In addition, Berlin was one of the most important centers for medical research, especially on communicable diseases, which meant that numerous experts in the German capital were often quoted by

medical journals and newspapers. Using German and Austrian newspapers and medical journals as well as similar materials from England and the United States, this team of undergraduates presented their research two workshops, hosted by the German Historical Institute and the National Library of Medicine, and will be developed in the future into an article or posting (11, 14). The role of German medical experts was also explored by a different team of undergraduate researchers who explored the international impact of Dr. Von Leyden, one of the world's leading experts on respiratory diseases, whose research position in Berlin at the start of the epidemic made him the focus of international reporting on the disease. This research will be integrated into future postings that explore the transmission of expert knowledge during the epidemic. Presentations at the Library of Congress, Manchester University, Edinburgh University, Yale University, Leibniz University, and Virginia Tech all approached this same question of how to use new tools and original source materials to understand the number of victims of the Russian influenza -- and to understand what kinds of meanings were attached to these counts at the time by both public health experts and the general population (6, 7, 8, 9, 10, 15, 16, 17). The relationship between the tone of reporting and the number of victims is being examined in a work in progress that applies computational methods to both text analysis and mortality statistics.

Dissemination of Digital Humanities Tools, Methods, and Analysis

As suggested above, this project has explored a range of approaches to understanding the value of digital humanities tools, methods, and analysis for understanding epidemics in historical contexts. All four of the articles published for this project are available open access without subscription or charge. The research postings hosted by Circulating Now from the National Library of Medicine and the Medical Heritage Library Research Blog are freely available (18, 19). Presentations at the Library of Congress and the Yale Medical Historical Library were open to the public, with the goal of bringing broad attention to the value of using publicly available tools for large scale text analysis. More than a dozen undergraduate students and four graduate students have been involved in this research project as research assistants, and many of these students have been able to contribute to presentations, postings, and publications.

Part III: Project Evaluation

Tracking the Russian Flu has succeeded in the project goals of exploring new methods for the digital humanities that connect computational methods and historical analysis. The project has explored a wide range of digitized source materials including newspapers and medical journals that can be analyzed using traditional methods of close reading and innovative methods for interpreting, evaluating, and visualizing meanings. As suggested in the case study in Part I of this report, the project has also encountered obstacles in the format of the digitized materials, including problems with optical character recognition, inconsistencies in the availability of digitized materials, subscription based collections that do not provide access to full text versions, and missing volumes. The collaboration between humanities scholars and computational researchers, including faculty, graduate assistants, and undergraduate students has highlighted the value of interdisciplinary inquiries at the intersection of digital humanities and medical history. This project has also taken advantage of the remarkable expansion in the availability of source materials as a result of digitization, including the availability of state medical journals, annual reports of national and state health departments, and contemporary research on the disease. Yet the project has also identified sources that exist still only in analog form, thus requiring site visits to archives such as the Detroit municipal archive, the Yale Medical Historical Library, the National Archives (UK), the History

of Medicine Division of the National Library of Medicine (NIH), and more. The project's focus on the relationship between English-language (primarily from the US and UK) and German-language (Germany, Austria, and Switzerland, and emigre newspapers in the US) was sustained through the collaboration between institutional partners (Virginia Tech and Leibniz University), the identification of the most useful source materials (especially the Austrian National Library Collection of Newspapers), and the contributions of a team of Virginia Tech graduate students with German-language reading skills. This component of the project will continue into the future, building on the themes outlined above, yet with the further goal of integrating other languages (especially French and Russian) into the analysis, thus replicating more fully the genuinely international components of the information networks that accompanied the spread of the Russian influenza. The outcomes of this project have been subjected to rigorous academic review at appropriate stages. The four articles were published in peer-reviewed journals with strong reputations in three distinct fields: infectious diseases, digital humanities, and medical history. The research was presented at four workshops and two conferences that resulted from peer review of submitted abstracts, thus further confirming the academic value of the project. The two research postings, each co-authored with undergraduate student researchers, were subjected to professional review by the editorial staff. The future development of this project will result in more steps to disseminate the research in ways that illustrate the sources, methods, and outcomes that result from bringing digital humanities perspectives and computational methods to the study of medical history.

Presentations, Publications, and Postings

- 1) E. Thomas Ewing, Veronica Kimmerly and Sinclair Ewing-Nelson, "'Look Out for La Grippe': Using Digital Humanities Tools to Interpret Information Dissemination during the Russian Flu, 1889-1890." *Medical History* Vol. 60, Issue 1 (January 2016), pp. 129-131. DOI 10.1017/mdh.2015.84.
- 2) E. Thomas Ewing, "'Will It Come Here?' Using Digital Humanities Tools to Explore Medical Understanding during the Russian Flu Epidemic, 1889-90," *Medical History*, Vol. 61, No. 3 (July 2017), pp. 474-477.
- 3) E. Thomas Ewing, "'The Two Diseases Are So Utterly Dissimilar': Using Digital Humanities Tools to Advance Scholarship in the Global History of Medicine." *Current Research in Digital History*, Vol. 1 (2018). George Mason University Center for History and New Media: <http://crdh.rrchnm.org/>.
- 4) E. Thomas Ewing, "La Grippe or Russian Influenza: Mortality Statistics during the 1890 Epidemic in Indiana," *Influenza and Other Respiratory Viruses*, Vol. 13, Issue 3, May 2019, pp. 279-287.
- 5) E. Thomas Ewing, "The Numbers Attacked Have Assumed Alarming Proportions: Narrative Reporting and Data Visualization during the Russian Influenza, 1889-1890." Presentation at Edinburgh University, United Kingdom, November 13, 2018.
- 6) E. Thomas Ewing, "Many Households in Which Every Member is Ill: Text Analysis and Statistical Representation during the Russian Influenza (1889-1890)." Presentation at Manchester University, United Kingdom, November 9, 2018.
- 7) E. Thomas Ewing, "Everybody had it in Imagination if Not in Reality: Digital Humanities and Network Analysis as Research Methods to Understand a Global Epidemic, 1889-1890." Presentation to the workshop, Reconstructing Historical Networks Digitally: New Approaches,

- Opportunities, and Epistemological Implications of Social Network Analysis, German Historical Institute, Washington, October 29, 2018.
- 8) E. Thomas Ewing, "The Relentless Grip: International Reporting, Vital Statistics, and Local Knowledge during the Russian Influenza Epidemic, 1889-1890." Presentation at Leibniz University, Hannover, June 13, 2018.
 - 9) E. Thomas Ewing, "Easy Victims to the Dreaded Russian Visitor: Local Knowledge during a Global Influenza Epidemic, 1889-1890." Presentation at Yale University Medical Historical Library, New Haven, May 31, 2018.
 - 10) E. Thomas Ewing, "Newspaper Publicity Given to La Grippe: Medical History, Text Analysis, and Data Visualization using Newspapers in Chronicling America." Presentation at Reference Librarians' Forum, Library of Congress, Washington DC, September 26, 2017.
 - 11) E. Thomas Ewing, "'La Grippe' is But a Newspaper Term: A Roundtable on the Study of Epidemic Disease through Historical Medical Journals and Newspapers." Presentation with undergraduate student researchers, hosted by the History of Medicine Division, National Library of Medicine (NIH), July 12, 2017.
 - 12) E. Thomas Ewing, "Something in the Air Puzzling Health Officials: Knowledge Production and Health Policy during a Global Influenza Epidemic, 1889-1890." Presentation at the workshop, Beyond Data, hosted by German Historical Institute, Washington, DC, June 1, 2017
 - 13) E. Thomas Ewing, "'All Nonsense and Newspapers': Reporting the 'Russian Influenza' (1889-1890) in European and American Medical Periodicals and Newspapers." Presentation for the workshop, Observing the Everyday, hosted by the German Historical Institute, Washington DC, March 3, 2017.
 - 14) E. Thomas Ewing, "How Many Victims of the Russian Flu? An Exercise in Data Interpretation and Historical Analysis." Presentation with undergraduate students, Virginia Tech History Department, November 30, 2016.
 - 15) E. Thomas Ewing, "Will It Come Here? Using Digital Humanities Tools to Explore Medical Understanding during the Russian Flu Epidemic, 1889-1890." Presentation for the American Association for the History of Medicine Annual Meeting, Minneapolis, May 1, 2016.
 - 16) E. Thomas Ewing, "The 'Prevailing Disorder': The Impact of the Russian Influenza on the United States, 1889-1890." Presentation with nine student researchers to the Network Dynamics and Simulation Science Laboratory of the Virginia Bioinformatics Institute, Blacksburg, October 23, 2015.
 - 17) E. Thomas Ewing, "Understanding the Scope and Severity of a Global Epidemic: Research on the Russian Influenza (1889-1890) Using Big Data Methods and Digital Collections." Presentation to the Annual Meeting of the American Association for the History of Medicine, Yale University, May 2, 2015.
 - 18) E. Thomas Ewing, Ian Hargreaves, Jessica King, Andrew Pregnall, and Tyler Talnagi, "Revealing Data: Using Term Frequency to Chart Influenza Reporting," *Circulating Now*, National Library of Medicine, November 14, 2018; "Revealing Data: Measuring Mortality during an Epidemic," *Circulating Now*, November 15, 2018; "Revealing Data: Close Reading and Textual Analysis as Historical Methods," *Circulating Now*, November 16, 2018. ([link](#))

- 19) E. Thomas Ewing, Veronica Kimmerly and Sinclair Ewing-Nelson, “Dr. Shrady Says: The 1890 Russian Influenza as a Case Study for Understanding Epidemics in History.” *Medical Heritage Library* Research Blog, Parts 1, 2, and 3. August September 2016. ([link](#))
- 20) E. Thomas Ewing, “Have We La Grippe? A Case Study of Newspaper Reporting on the Russian Influenza, 1889-1890.” Chapter accepted for publication in volume, *Observing the Everyday*, revision submitted July 2018.

ORIGINAL ARTICLE

WILEY

La Grippe or Russian influenza: Mortality statistics during the 1890 Epidemic in Indiana

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Background: The Russian influenza, which began in late 1889, has long been recognized as a major global epidemic yet available statistical evidence for morbidity and mortality has not been fully examined using historical and epidemiological tools. This study of cases and deaths in Indiana during the extended time period associated with the Russian influenza is the first scholarly effort to determine the number of victims from this influenza outbreak across a broad regional case study in the US.

Methods: The sources for this study include historical records from the US Census, Annual Reports from the Indiana State Board of Health, and death notices published in newspapers. The available evidence is analyzed using historical and epidemiological methods to determine the consistency of reporting categories, the accuracy of death records, and the applicability of contemporary categories for measuring mortality.

Results: In the 3 years during and following the outbreak of “Russian influenza” in January 1890 in the state of Indiana, approximately 3200 died specifically of this disease while a total of 11 700 died of influenza and other respiratory diseases. These results confirm that extremely widespread influenza contributed to higher than normal death rates by causing additional deaths in related categories, especially pneumonia and other respiratory diseases.

Conclusions: More reliable and thorough analysis of morbidity and mortality during the Russian influenza based on systematic and critical review of local, regional, and national statistics can inform contemporary understanding of the long-term history of influenza epidemics.

KEYWORDS

epidemic, epidemiology, history, influenza, mortality

1 | INTRODUCTION

On January 26, 1890, the *Indianapolis Journal* newspaper noted the “steady increase in the city death rate for the past 4 weeks.”¹ In fact, the weekly total of deaths had doubled, from 28 at the start of the month to 55 in the preceding week. The “sole cause” for this “sudden

increase” was reported to be influenza “and its various complications.” Of the 169 total deaths reported in January, more than 20% “have been due to complications of influenza.” In addition to these quantitative measures, the article provided a list of victims, most with ages and addresses, classified as “deaths here from simple and aggravated cases of influenza.”

One listed victim was John Bussey, a saloonkeeper, who died at age 62 on January 2, 1890. Yet this man's death, and the way it was reported in the newspaper, illustrates how counting influenza deaths was problematic even at the level of individual victims. On January 3, the *Indianapolis Journal* reported that Bussey died at his home "from what was supposed to be the influenza," after "suffering from the disorder for a few days."² But this same article used Bussey's death to highlight the debate among "local physicians as to whether or not la grippe can actually claim any victims in the city, it believed by some that no case had yet appeared in the State." The latter position was affirmed by Marion County Coroner Dr. T. A. Wagner: "I would be willing to put up fifty dollars that there is not a single case in the city. Those physicians who claim they have patients suffering from it are only mistaken in their diagnoses."

Although these newspaper articles illustrated growing awareness about an unusual number of influenza cases and deaths, the Indiana Board of Health Annual Report indicated that the total number of deaths in January 1890 was actually quite consistent relative to previous years (Figure 1).³⁻¹⁰ The total of 1386 deaths in January 1890 was only 2% higher than the January average for the years 1883-1889. As will be discussed more fully below, these Board of Health numbers, although detailed, represented only one-half of total deaths in the state.

These three examples—the death of John Bussey, a newspaper article calling attention to increased death totals, and statistical data comparing successive years—illustrate both the challenges and the importance of determining the actual impact of any disease outbreak, but particularly an influenza epidemic. This analysis focuses on the tensions embedded in these three reports, as the confidence (and denial) expressed by physicians and health officials related to Bussey's death can be compared to the more alarmist tone of the newspaper article calling attention to the sudden change in the number of deaths, even as the long-term perspective from annual reports suggests that these fears may have been exaggerated.

Understanding the number of cases and deaths during the epidemic that began in 1890 matters because this outbreak is one of the major influenza epidemics of the last two centuries, occurring at a moment when physicians and officials recognized vital statistics as

a tool to improve public health, yet were still working out methods for measuring morbidity and mortality. This approach takes a unique approach to historical epidemiology by examining all available data about cases and deaths within a defined geographical space. The study of historical epidemics faces many of the same challenges as contemporary efforts to document influenza-associated deaths, including the importance of distinguishing excess mortality during severe outbreaks from typical mortality caused by seasonal influenza, the lack of reliable tests confirming influenza as cause of death for individuals, the potential for underlying structural causes to affect mortality levels, and the importance of counting deaths for which influenza may be an associated, but not direct, cause of death. These interpretive challenges are evident in the varied terminology used in current studies, including influenza-associated mortality, deaths from respiratory and circulatory diseases or pneumonia and influenza, and cases of influenza-like illness.¹¹⁻¹⁶ Given these challenges, which are even more complicated for a historical study, this article integrates a wide range of publicly available data on diseases and deaths, including the 1890 US Census (available from the US Census Bureau), the Indiana State Board of Health annual reports (available from Hathi Trust library), and articles about death rates and individual victims in newspapers (available in digital newspaper collections).

The objective of this study was to contribute to scholarship on morbidity and mortality during the 1890 influenza epidemic, thus building upon scholarship that documents death rates during historical epidemics. While most research on the Russian influenza has focused on the spread of disease, the response of medical authorities, and the cultural experience of an epidemic,¹⁷⁻²² the few efforts to measure the impact of the epidemic have relied on a limited number of statistical reports drawn mostly from major cities, which are then generalized to make broader claims.²³⁻²⁶ This study, by contrast, explores all of the available evidence for a particular region, while also recognizing the need to think critically about the origins, nature, and implications of the statistical information collected during and after the epidemic to enhance understanding of both this historical example and broader challenges of influenza epidemiology. This approach illustrates important similarities with the

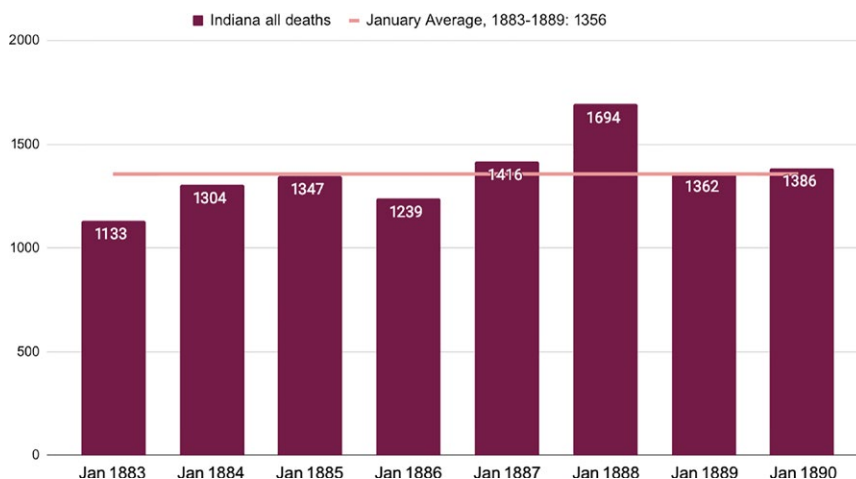


FIGURE 1 Indiana, Deaths from all causes, January 1883-1889³⁻¹⁰

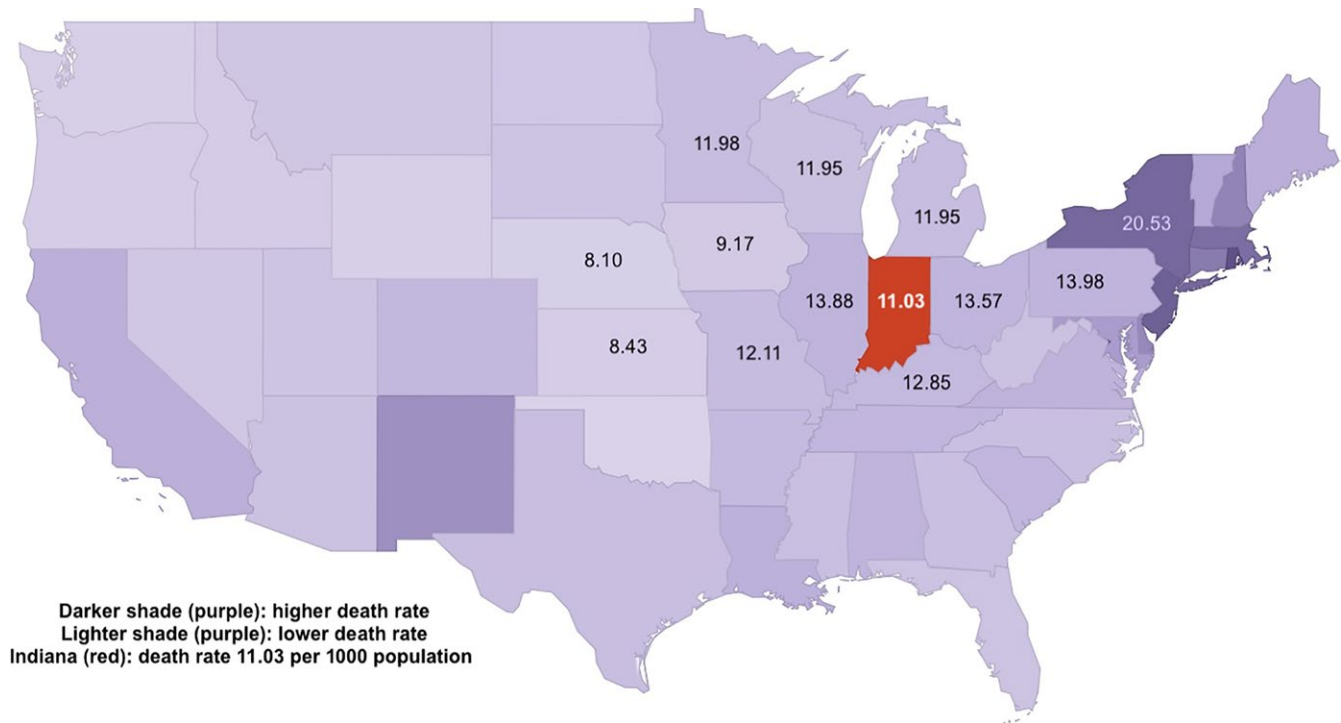


FIGURE 2 Death Rate, all causes, compared to Indiana, 1890 Census³²

Spanish influenza almost three decades later, including the rapid spread of the disease and the unexpected impact on death rates, while also acknowledging the much higher mortality rates that began in the fall of 1918.²⁴⁻³⁰

Indiana is selected for this case study because the population was broadly representative of the US but also because the available data make it possible to engage in thoughtful analysis of influenza cases and deaths. According to the 1890 census, Indiana was the eighth most populous state, with a population of just under 2.2 million, which accounted for 3.5% of the US population of 62 million.³¹ Indiana ranked tenth in the US in terms of total deaths, according to the 1890 census, but thirty-third in terms of death rates, with a much lower rate (11.03 deaths per 1000 population) than states with larger populations on the eastern coast, but broadly similar to the states also located in this region of the country (Figure 2).³² Given these patterns, Indiana can serve as a representative case study with a substantial population and a death rate consistent with comparably sized and located states.

Influenza only appears as a cause of death in one table in the 1890 census with statistics from all states: Table 18, which includes "La Grippe" as one of 137 specific causes listed alphabetically but not grouped by any classifications, for the census year, which began on June 1, 1889 and ended on May 31, 1890.³² According to this table, 630 deaths were attributed to influenza in Indiana, compared to 12 957 deaths in the US. In Indiana, influenza accounted for 2.6% of all deaths with a death rate of 0.29 deaths per 1000 population. In the US, influenza accounted for 1.5% of all deaths with a death rate of 0.21 deaths per 1000 population. In terms of both percentage of all deaths and death rate, influenza

accounted for proportionally more deaths in Indiana than in the US as a whole.

Indiana Board of Health Reports provide a different number for total deaths during the epidemic.¹⁰ The state reported deaths by fiscal year, so the 1890 Annual Report attributed 388 deaths to "La Grippe" from October 1, 1889, to September 30, 1890, which included the peak weeks of the epidemic in January-March 1890. In addition, the 1890 Annual Report attributed two deaths to "Influenza," listed separately from "La Grippe." For the census year, from June 1, 1889, to May 31, 1890, the combined statistics from the 1889 and 1890 annual reports indicate 343 deaths from influenza.^{10,33} Finally, during the calendar year 1890, the combined statistics from the 1890 and 1891 reports indicated 403 deaths from influenza. All four of these numbers—343, 388, 403, and 630—are documented answers to the question: How many people died in Indiana from influenza during the 1890 epidemic?

The most obvious explanation for the difference between the higher census number and the lower state totals is the fact that the Board of Health statistics were admittedly incomplete. According to the 1890 Annual Report, "not one-half of deaths are reported" by county health officers.¹⁰ In fact, a comparison for the census year indicates that the Board of Health statistics accounted for just 62% of deaths reported in the census. This ratio was consistent across respiratory diseases, including la grippe (54%), phthisis (55%), pneumonitis (58%), and bronchitis (60%). In this sense, the US census total is actually confirmed by the State Board of Health, even as it reported just one-half the number of deaths.

Yet the challenges of counting influenza deaths began at the level of individual victims, as suggested by the example of Bussey

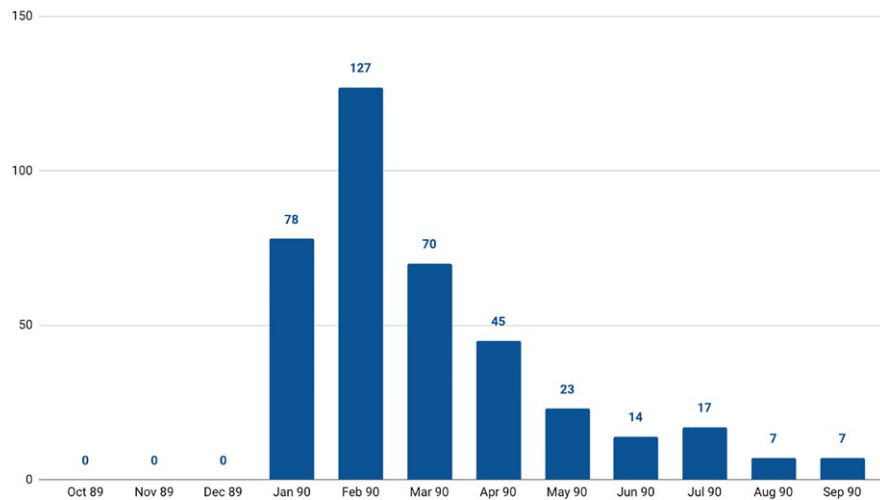


FIGURE 3 La Grippe Deaths in Indiana, 1890 annual report¹⁰

cited above. Newspaper obituaries and death notices occasionally identified influenza or la grippe as the primary cause of death: Jacob Kiefer “died from influenza after an illness of two days,” Minnie Arnold died of “la grippe,” and John Wood died of “old age and influenza” after being sick “for some time.”^{34–37} In other cases, influenza or la grippe was paired with another disease. Robert Bence died from “a complication of influenza and pneumonia,” Carrie Garnett, an African American woman, died of “chronic bronchitis and influenza,” Charles Howard, less than 2 years old, died of “inflammation of the brain and la grippe,” and Jesse Burdett, “died from heart disease a la grippe.”^{38–40} The deaths of these individuals, as reported by newspapers, illustrate both the human costs of this disease and the challenge of identifying cause of death in ways that provide a meaningful and consistent basis for quantified analysis.

Whereas the cause of death illustrated ambiguity in reporting categories, the sudden spike in deaths attributed to influenza (Figure 3)¹⁰ was readily apparent at the time to observers and subsequently confirmed by the State Board of Health. According to monthly reports for the state, the spike in influenza deaths in the first 3 months of 1890 accounted for more than two-thirds of deaths from this cause during the entire year. Unfortunately, because the State Board of Health only began to record La Grippe deaths following the outbreak in January 1890, it is not possible to make direct comparisons to this cause of death in previous years.

The perception of the influenza epidemic as a substantially different moment in public health was illustrated in the opening section of the Board of Health Annual Report for 1890, published toward the end of the year: “During the latter part of last year and the first of this year La Grippe or Russian influenza made its appearance and swept over the entire State.”¹⁰ The report declared that while “the mortality directly traceable to the disease was comparatively light,” many victims were “in such a debilitated condition that many deaths occurred from sequelae of the attack.” The report conceded, however, that efforts “to get complete statistics concerning the disease” had not been successful, in part because few physicians actually maintained records of cases or deaths, leading to the following

conclusion: “Only about 400 deaths are reported from this cause, which number is doubtless too small, but the exact number cannot be known.”¹⁰

Reports from county health officers provide further evidence for the importance, but also difficulties, of measuring the impact of the epidemic.¹⁰ Of the 36 reports published by the State Board of Health for 1890 (more than one-third of all counties), 30 specifically referenced the La Grippe epidemic. Many county health reports acknowledged the unusual extent and even severity of the epidemic, often expressed in vivid imagery. Dr. V. H. Gregg, Health Board Secretary in Fayette County, reported that “influenza (la grippe) in the winter of 1889 and 1890” had epidemic characteristics: “reaching from ocean to ocean, and spreading from continent to continent, like a chilly wave, casting a gloom of awe over us for a few days, leaving scarcely a trace of its ravages, except a sequela of some few chronic cases of tuberculosis or rheumatic diathesis.” Dr. W. V. Wiles, Health Officer for Owen County, offered a colorful description of “the ravages of that new enemy of the human family, la grippe” which first appeared in November 1889:

During the first three months, only a small proportion of the population was affected, but within the next three months, fully four-fifths of the people, of all classes, had become affected. It approached its victims, as a rule, without warning or premonitory symptoms and prostrated them as unceremoniously as an expert sandbagger would fell the belated and weary pedestrian.

This sense of a widespread epidemic was consistent with emphatic, although imprecise, statements about the proportion or number of victims: 80% of the population in Owen and Warrick Counties, a “majority of the people” in Henry County, a “large majority” in Tippecanoe County, “all over” Boone and Newton Counties, “almost universal” in Kosciusko and Putnam Counties, “nearly everybody was sick with it” in Fulton County, and “quite a

number" in Jay County. By contrast, many fewer reports described the epidemic as having only a limited effect. In Lake County, "very few cases of 'La Grippe' [were] reported; most of them recovered." In Ripley County, the "epidemic of la grippe, although involving many in its wicked grasp, disappeared without doing much damage to the public health."

Just four county health reports included specific information about the number of victims: "almost three hundred cases of la grippe" in Adams County, 3461 cases in Hendricks County, 3000 cases in Clinton County, and 7396 cases in Wayne County. Census data³¹ make it possible to calculate a very wide range of morbidity rates per 1000 population: 14.87 in Adams County, 109.61 in Clinton County, 160.99 in Hendricks County, and 196.56 in Wayne County.

Reporting on deaths offered a similar combination of limited numerical data together with broad statements, with the latter consistently claiming low mortality rates. In Montgomery County, "notwithstanding the number affected by this disease, the mortality was small." In Porter County, influenza produced "very few, if any, deaths." In Whitley County, "the disease was very mild in the great majority of cases; indeed, a great many cases were observed which did not require any treatment, and only a few deaths were attributed to this disease."

County health reports confirmed the evidence from individual victims cited above regarding the higher death rate when complicated by other health conditions. Dr. J. F. Beckner stated that la grippe was "general all over" in Newton County: "But few deaths occurred at the time of its prevalence, but it caused many deaths throughout the county by awakening latent diseases, such as tuberculosis and rheumatism, and a few cases of insanity that were caused by la grippe." Putnam County Health Board Secretary G. W. Bence offered a detailed account of the epidemic's impact:

The immediate death rate was small for so severe and general an epidemic, but the remote effects are still felt. Many cases of incipient phthisis were precipitated; hence the deaths from phthisis are increased in number, and in many persons the system was left so debilitated that attacks of the most common diseases assumed a more severe character and were more difficult to control.

Vigo County Health Officer Leo J. Weinstein attributed no deaths to influenza, "so far as I know," but he added this qualification: "Of course many died from other causes during the epidemic that would otherwise not have done so."

The few county reports that provided statistics on the number of deaths offer important insights into the impact of the epidemic. In Hendricks County, 3461 cases resulted in just 26 deaths, and "most of these were suffering from chronic disease." Clinton County recorded four deaths from influenza and four more deaths from "diseases complicated with la grippe." In Lagrange County, influenza caused only two or three deaths, out of more than seventy deaths from all causes. In White County "directly or indirectly perhaps a

dozen deaths were caused by the above-named disease, and its effects are still felt by many." In Randolph County, seven deaths were attributed to influenza and three deaths to la grippe, accounting for 8% of all deaths.

Do county reports provide a basis for estimating the number of influenza victims in Indiana? The answer, and thus the reliability, depends on which numbers are used for making estimates. Using the reported rate for Wayne County, one in four, would suggest that more than 500 000 people in Indiana suffered from influenza in early 1890. Using reports from other counties would produce completely different estimates of the number of cases: The morbidity rate of 14.87 reported from Adams County would indicate just 32 000 victims, whereas the rate of 160.99 in Hendricks County would indicate 354 000 victims. If 80% of the population was ill, a rate suggested by statements that "nearly everybody" was sick and the disease was "almost universal," the total victims could have been 1.75 million.

Given this range of potential morbidity, estimates of case fatality rate (CFR) will be equally inconsistent, and thus mostly unreliable. If influenza caused 630 deaths in the state, out of an estimated 500 000 who were sick (a relatively conservative estimate that one-quarter were sick), the CFR would be 0.13%. In Hendricks County, which presented very specific numbers, 26 deaths from 3461 cases result in a CFR of 0.75%. In Adams County, which also presented specific numbers, 8 deaths from 300 cases result in a CFR of 2.67%, twenty times higher than estimated state rate. These estimates are consistent with claims that widespread illness contributed to increased death totals, even if these other studies have not attempted to calculate case fatality rates through a close study of mortality data, as is done here.²³

As recognized by several health officers as well as the individual deaths recorded in newspapers cited above, deaths attributed specifically to la grippe represented just a fraction of deaths associated with the epidemic. The Board of Health statistics indicate that deaths from influenza in combination with other respiratory diseases spiked dramatically in the first 3 months of 1890 (Figure 4).¹⁰ The quantitative evidence confirms observations of county health officers that a dramatic change was being taking place, even if they were reluctant to specify exact numbers of cases or deaths.

Yet any historical interpretation of the 1890 influenza epidemic also requires considering developments in following years. In fact, the number of deaths actually increased following the outbreak: 409 in 1891 and 1152 in 1892.^{10,33,41} Figure 5, showing the monthly totals for these 3 years, illustrates how the deaths during the peak period of the 1890 epidemic (127 deaths recorded in February 1890) compared to subsequent months, five of which recorded more deaths: April 1891 (132), December 1891 (136), January 1892 (477), and February 1892 (228). The January 1892 total was almost seven times higher than the 77 deaths recorded in January 1890. Figure 6, combining deaths from pneumonitis and la grippe, confirms how much influenza-associated deaths in early 1892 exceeded 1890 totals. These patterns were consistent with reports from other regions, which also indicated an increase in total deaths from influenza-associated causes in 1891 and 1892.^{24,26}

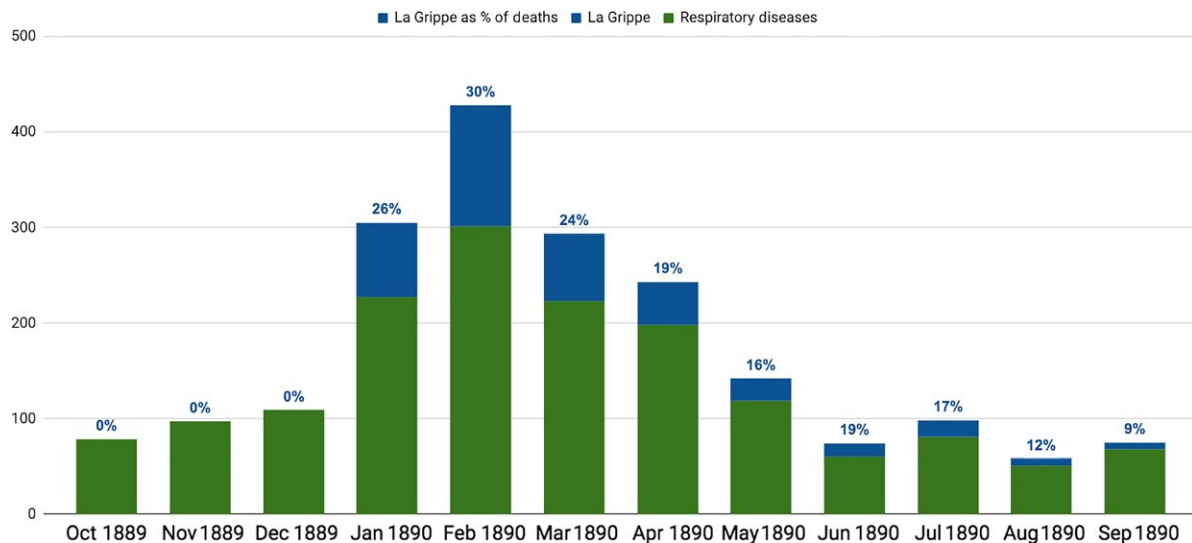


FIGURE 4 Indiana, Deaths from La Grippe and respiratory illnesses, 1890 Report¹⁰

The reference in the Fulton county health reports to deaths among “the aged and infirm” calls attention to the distribution of deaths by age category. As indicated in Table 1, deaths from influenza in the period beginning in 1890 were broadly consistent with the pattern evident in prior years (and still evident today) with highest death rates among children under 10 and the elderly.²⁶ The death rates for adults aged 20-50 years showed little change over these 5 years. The consistency of these patterns provides further evidence for the perception of influenza as relatively mild because the increased total deaths occurred mostly within established categories.

Although the number of total deaths and particularly the number of influenza-associated deaths spiked in spring 1891 and rose even higher in early 1892, county boards of health expressed little concern about the disease. Of the more than fifty county reports included in the 1891 report, just fourteen mentioned influenza, which

is only half as many as reported on this disease a year earlier, when the disease was something unexpected.³³ One year later, in the 1892 report, only one-third of county health officers referred to influenza, even though the 811 deaths from this single cause were three times higher than the 1890 totals.⁴¹ It appears that county health officers, just like newspapers reporters and the general public, found a new disease outbreak more compelling than one that was expected, even if more deadly.

Given these patterns, it is easy to conclude that county health boards overreacted when they described the widespread effects of influenza in early 1890. Yet quantitative evidence also confirms that health officers had reason to be concerned. As shown in Figure 7, which compares the death toll in January 1890 to the same total in January 1889 for the largest counties in the state (to ensure meaningful comparisons), two-thirds recorded more deaths

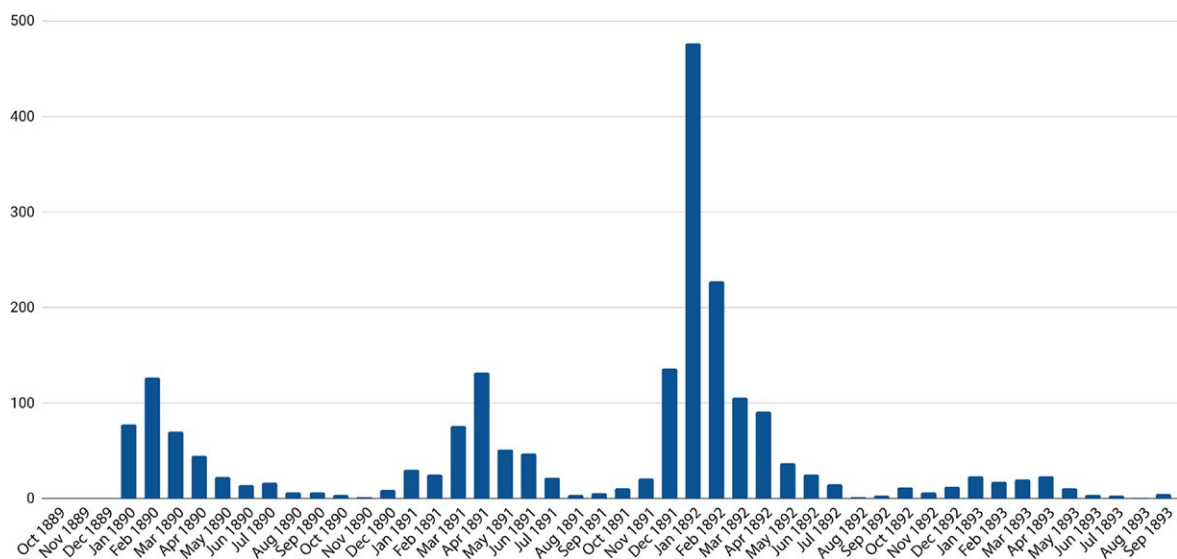


FIGURE 5 Indiana, La Grippe Deaths monthly, October 1889 to September 1893¹⁰

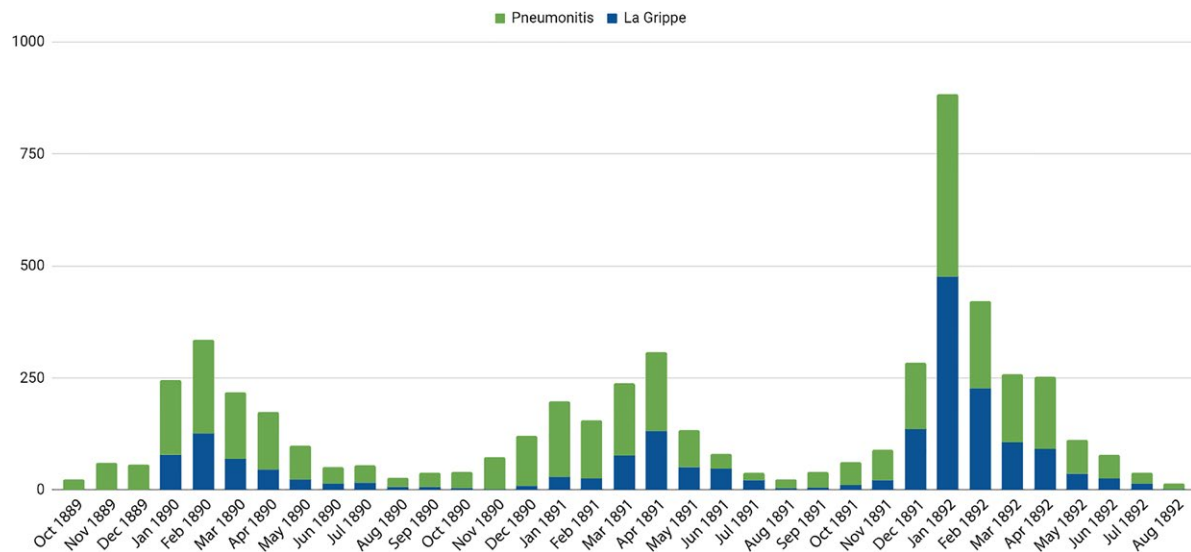


FIGURE 6 Deaths from La Grippe and Pneumonitis, October 1889 to September 1893^{10,33,41}

TABLE 1 Death rates by age-group, respiratory diseases and influenza, 1888 to 1892^{9,10,33,41}

Year	<10 y	10-20 y	20-30 y	30-40 y	40-50 y	50-60 y	60-70 y	>70 y
1888	1.35	0.36	0.51	0.65	1.01	1.30	2.98	6.77
1889	1.32	0.23	0.27	0.39	0.47	0.78	1.77	4.66
1890	1.26	0.26	0.47	0.57	0.68	1.12	2.10	5.88
1891	1.36	0.26	0.41	0.53	0.68	1.01	2.62	5.88
1892	1.39	0.28	0.59	0.76	1.11	2.07	5.01	14.48

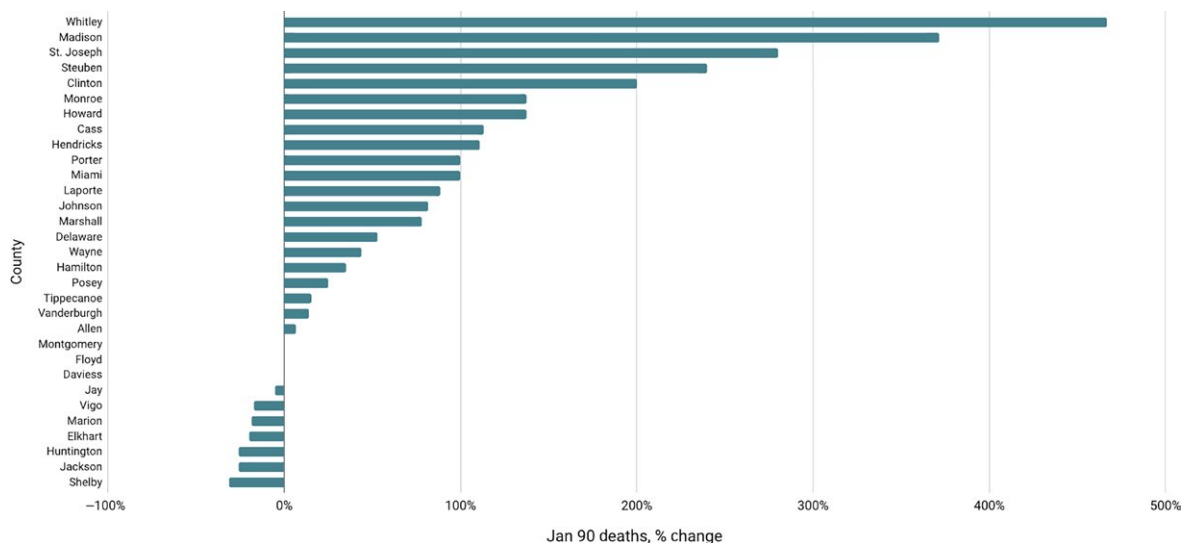


FIGURE 7 January 1890 Deaths as percentage of January 1889 Deaths, for largest counties^{9,10}

than they had 1 year earlier—and in many counties, the total had doubled, tripled, or more.^{9,10} But several large counties, including Marion County, the location for Indianapolis, actually recorded fewer deaths in January 1890 than in the same period a year earlier, which explains why overall deaths for Indiana showed little

change, increasing just 1% from 1379 deaths in January 1889 to 1395 deaths in January 1890.

Further evidence for the importance of understanding the context in which statistics were gathered, reported, and evaluated, particularly when it came to very high death rates, can be seen by

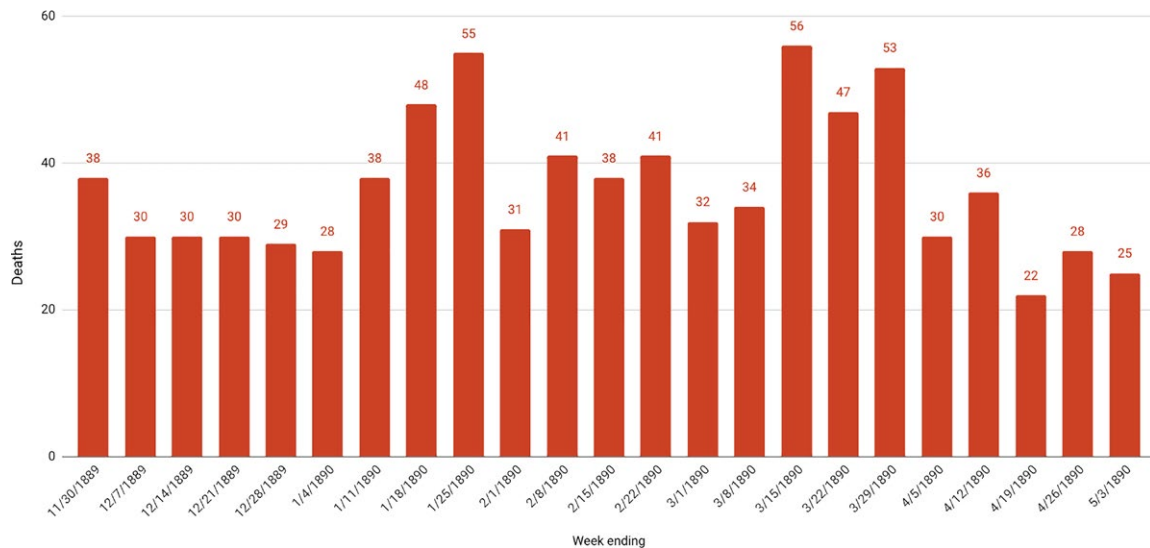


FIGURE 8 Deaths, Indianapolis, Weekly, November 1889 to May 1890⁴²

a pattern of deaths from all causes in Indianapolis over a 6-month period (Figure 8).⁴² The January 26, 1890 *Indianapolis Journal* article cited above was published at the moment death rates spiked—thus the accurate reference to a “sudden increase”—yet in the following week, deaths suddenly began to decrease, falling to a weekly total of 31. The 5 weeks that followed showed significant variation but not major increases. When death rates spiked again, in March 1890, perhaps indicating that some victims were suffering a second onset of illness, reaching a total actually exceeding the peak in January, it did not prompt any apparent concern, as the same newspaper referenced an increase in consumption deaths, but without further commentary.⁴³ One of the significant contributions of historical epidemiology is placing both statistical evidence and interpretive statements in a broader context, thus recognizing the distinctiveness of critical moments while placing them in relationship to long-term patterns. It was quite appropriate for the editors of the *Indianapolis Journal* and county health officers to comment on the unusual nature of the La Grippe epidemic, even as their own statistics can be used to indicate how these peak moments related to broader patterns.

Based on the above evidence and the critical analysis of reliability, consistency, and accuracy, it is reasonable to estimate that in Indiana, over 3 years beginning in January 1890, approximately 3200 people died of influenza and 11 700 people died of influenza and other respiratory diseases. These estimated totals are calculated using the number of deaths recorded by the State Board of Health from January 1890 to December 1892 for disease categories Respiratory (all) and La Grippe (listed under Miasmatic), with adjustments recognizing that state records included just over one-half (62%) of the deaths reported by the census.^{10,32,33,41}

These estimated totals indicate a mortality rate per 1000 population from just influenza of 0.30 (1890), 0.41 (1891), and 0.75 (1892) and for influenza-associated deaths of 1.56 (1890), 1.64 (1891), and 2.15 (1892). These rates are consistent with broad estimates for European countries such as France (1.6) and Germany (1.3) of deaths

from “influenza and its complications” per 1000 population during and after the initial outbreak.²⁶ Applying the Indiana rates to the US population of 62 million produces an estimated number of influenza victims of just under 100 000 and respiratory diseases and influenza victims of more than 300 000 during these 3 years. These estimates also suggest that the number of influenza victims increased in 1891 and 1892, but sporadically, without prompting the same alarm as in the first months of 1890, when “La Grippe or Russian influenza made its appearance and swept over the entire State.”

The death totals associated with influenza in the early 1890s never reached the levels that would appear during the Spanish Influenza, when influenza and pneumonia claimed more than 17 000 lives in Indiana in 1918 and 1919, accounting for more than one-fifth of deaths from all causes.^{29,30} The fact that mortality patterns by age categories remained within expected patterns in 1890 provides another important contrast to the 1918 Spanish Flu, when mortality rates rose unexpectedly among the age-groups from 20 to 40.²⁷ As this study has suggested, however, the significant increase in deaths from influenza that began in 1890 is essential for understanding both the later, more deadly, epidemic and current perspectives within epidemiology regarding influenza-associated diseases, which remain among the ten most significant causes of death, despite a continued perception of influenza as not particularly threatening.¹³ The more experts, physicians, and the public understand about previous epidemics, this study argues, the more likely future outbreaks will be met with reasoned perception and factual knowledge.

This estimate of deaths nationally presumes that death rates among other populations are broadly similar to Indiana’s death rates, as reported by the Board of Health and critically interpreted in this study. The best way to test this estimate, for the US and on a global scale, is to undertake a similarly detailed and critical examination of records from national health departments, regional, state, and municipal boards of health, newspapers, and medical journals, across a broad geographical span, in order to more accurately answer the

important historical and epidemiological question of how many deaths resulted from the Russian influenza epidemic.

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CONFLICT OF INTEREST

None declared.

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REFERENCES

1. Indianapolis Journal. January 26, 1890.
2. Indianapolis Journal. January 3, 1890.
3. Second Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1883. Indianapolis: State Printing, 1884.
4. Third Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1884. Indianapolis: State Printing, 1885.
5. Fourth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1885. Indianapolis: State Printing, 1886.
6. Fifth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1886. Indianapolis: State Printing, 1887.
7. Sixth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1887. Indianapolis: State Printing, 1888.
8. Seventh Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending October 31, 1888. Indianapolis: State Printing, 1889.
9. Eighth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending October 31, 1889. Indianapolis: State Printing, 1890.
10. Ninth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1890. Indianapolis: State Printing, 1891.
11. Thompson WW, Weintraub E, Dhankhar P, et al. Estimates of US influenza-associated deaths made using four different methods. *Influenza Other Respir Viruses*. 1990;3(1):37-49.
12. Simonsen L, Clarke MJ, Williamson GD, Stroup DF, Arden NH, Schonberger LB. The Impact of Influenza Epidemics on Mortality: introducing a Severity Index. *Am J Public Health*. 1997;87(12):1944-1950.
13. Heron M. Deaths: leading Causes for 2016. *Natl Vital Stat Rep*. 2018;67(6):1-15.
14. Dawood FW, Iuliano AD, Reed C, et al. Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation. *Lancet Infect Dis*. 2012;12(9):687-695.
15. Overview of Influenza Surveillance in the United States. Center for Disease Control and Prevention. October 11, 2018.
16. Estimating Seasonal Influenza-Associated Deaths in the United States. January 28, 2018. https://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm.
17. Bresalier M. A Most Protean Disease': aligning Medical Knowledge of Modern Influenza, 1889-1914. *Med Hist*. 2012;56(4):481-510.
18. Honigsbaum M. A History of the Great Influenza Pandemics. Death, Panic, and Hysteria, 1830-1920. London: IB Tauris, 2014.
19. Mussell J. Pandemic in print: the spread of influenza in the Fin de Siecle. *Endeavour*. 2007;31(1):12-17.
20. Ewing ET, Kimmerly V, Ewing-Nelson S. Look out for la grippe: using digital humanities tools to interpret information dissemination during the Russian Flu, 1889-1890. *Med Hist*. 2016;60(1):129-131.
21. Ewing ET. The two diseases are so utterly dissimilar: using digital humanities tools to advance scholarship in the global history of medicine. *Curr Res Digit Hist*. 2018;1.
22. Ewing ET. Will it come here? using digital humanities tools to explore medical understanding during the Russian Flu epidemic, 1889-90. *Med Hist*. 2017;61(3):474-477.
23. Valleron AJ, Cori A, Valtat S, et al. Transmissibility and Geographic Spread of the 1889 Influenza Pandemic. *Proc Natl Acad Sci*. 2010;107(19):8778-8781.
24. Dehner G. *Influenza. A Century of Science and Public Health Response*. Pittsburgh, PA: University of Pittsburgh Press; 2012.
25. Spinney L. *Pale Rider. The Spanish Flu of 1918 and How it Changed the World*. New York, NY: Public Affairs; 2017.
26. Patterson KH. *Pandemic Influenza 1700-1900. A Study in Historical Epidemiology*. New York, NY: Rowman & Littlefield; 1986.
27. Bristow NK. *American Pandemic. The Lost Worlds of the 1918 Influenza Epidemic*. New York, NY: Oxford University Press; 2012.
28. Indianapolis, Indiana. Influenza Encyclopedia. Ann Arbor: University of Michigan Center for the History of Medicine, accessed 2018.
29. Mortality Statistics. *Nineteenth Annual Report*. Washington, DC: Government Printing Office; 1918:1920.
30. Mortality Statistics. *Twentieth Annual Report*. Washington, DC: Government Printing Office; 1919:1921.
31. *Report on the Population of the United States at the Eleventh Census: 1890. Part I*. Washington, DC: Government Printing Office; 1895. (old 28)
32. *Report of the Vital and Social Statistics of the United States at the Eleventh Census: 1890. Part III*. Washington, DC: Government Printing Office; 1894.
33. Tenth Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1891. Indianapolis: State Printing, 1892.
34. Indianapolis Journal. February 3, 1890.
35. Indianapolis News. February 15, 1890.
36. Indianapolis News. January 25, 1890.
37. Indianapolis News. January 24, 1890.
38. Indianapolis News. January 23, 1890.
39. Indianapolis News. January 22, 1890.
40. Indianapolis News. January 14, 1890.
41. Eleventh Annual Report of the State Board of Health of Indiana for the Fiscal Year Ending September 30, 1892. Indianapolis: State Printing, 1893.
42. Indianapolis Journal. December 1, December 8, December 15, December 22, December 29, 1889; January 5, January 12, January 26, February 2, February 9, February 16, February 23, March 2, March 9, March 16, March 23, March 30, April 6, April 13, April 20, April 27, 1890.
43. Indianapolis Journal. March 16, 1890.

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Media Reviews

Will It Come Here? Using Digital Humanities Tools to Explore Medical Understanding during the Russian Flu Epidemic, 1889–90

On December 18, 1889, the *Detroit Free Press* asked an intriguing question in the headline: ‘Will It Come Here?’¹ The ‘It’ in the headline was the so-called ‘Russian Flu’, an outbreak of influenza that was first noticed on a global scale in St Petersburg, the capital of Russia.² As this disease spread across Europe, American medical authorities as well as the popular press expressed increasing concern about whether the disease would cross the Atlantic and reach the United States.³ To answer this question, newspaper reporters all over the country, as in this *Detroit Free Press* article, turned to local authorities, doctors and physicians from their cities, who were asked to share their opinion about influenza. In this same period, many medical journals published editorials commenting on the spread of the disease, the likely course of further development and the means for preventing or treating outbreaks. This paper examines comments by local doctors published in the *Detroit Free Press* and one editorial published in *Medical Age*, a semi-monthly journal also published in Detroit, as a way to introduce a broader research project engaged in three innovative methods that link the digital humanities and medical history: comparing medical reporting in daily newspapers and medical journals to explore connections across local, regional, national and international levels; combining traditional historical methods of close reading with new tools available for large-scale textual analysis; and developing methods that engage undergraduate students as research collaborators at every stage of the process.

A close reading of the *Detroit Free Press* article of December 18 cited above reveals the complex ways in which information about the Russian flu came to doctors, their processes for making sense of diverse information sources and their role in interpreting that information for public dissemination. The first doctor quoted in the article, Dr Donald Maclean, stated that the disease could be communicated from one person to another, and thus it might spread to Detroit, and that, while influenza was rarely fatal, it should not be disregarded. Dr T.A. McGraw was ‘somewhat skeptical’ about reports of influenza in New York City, because whenever many cases are reported in newspapers, people assume that all victims suffer from the same disease. McGraw challenged the theory that influenza microbes were blown from place to place on the grounds that ‘the general direction of the wind is from west to east, while the influenza comes here from the western world’. Instead of being carried by the wind, McGraw declared, ‘People bring it in their clothes.’ Regardless of how the disease was transmitted, according to McGraw, Detroiters should not ‘fear any epidemic of this sort’, but should ‘treat it carefully’, as even though it was ‘seldom fatal’, it was dangerous to ‘aged and sickly people’ and can even give ‘a strong man a pretty severe attack’. Finally, Detroit physician Dr B.P. Brodie had not heard of

¹ *Detroit Free Press*, 18 December 1889. Funding for this research was provided by the US National Endowment for the Humanities.

² Mark Honigsbaum, *A History of the Great Influenza Pandemics: Death, Panic, and Hysteria, 1830–1920* (London: I.B. Tauris, 2014).

³ See the analysis of how one influential editorial shaped perceptions on a national level in E. Thomas Ewing, Veronica Kimmerly and Sinclair Ewing-Nelson, ‘“Look Out for La Grippe”: Using Digital Humanities Tools to Interpret Information Dissemination during the Russian Flu, 1889–90’, *Medical History*, 60, 1 (2016), 129–31.

any cases and, although he conceded that the disease ‘might’ break out in Detroit, he too reassured the public: ‘influenza is, at the worst, but a very troublesome and disagreeable disease’. Repeating the claim that influenza ‘very rarely proves fatal’, the newspaper did affirm that the disease ‘requires constant attention and treatment’.

Just one week later, on December 26, 1889, the *Medical Age* published an editorial under the title, ‘The Prevailing Influenza’, which provided a general account of the disease, its previous historical manifestations and specific information about its origins, causes and symptoms.⁴ The first sentence set out both the scope of the disease and the sources of information available to the journal editors: ‘That this affection is at present epidemic and very generally distributed over the East and West is apparent from the cases reported in the medical journal and the interest manifested by the daily papers.’ This opening paragraph indicates that ‘the prevailing influenza’ is a familiar disease yet is also manifesting special traits and conditions. The remainder of this article, which includes a substantial amount of text reprinted from an editorial in the *Medical Record*, published in New York City, provided a more detailed account of the disease’s spread across Europe, some historical background on previous influenza epidemics, the likely means of transmission, a list of symptoms, recommendations for treatment and reassurance that the disease should not cause serious consequences for Detroit or the United States as a whole.⁵

In the course of one week, from December 18 to December 26, these two articles provided Detroiters with a sequence of authoritative statements about the prevailing influenza. A reader who looked at these two articles would probably come away with a general impression that included the following elements: that the current outbreak of influenza was more widespread than usual, although the reasons for the speed and scope of the outbreak were not known; that the disease was spread by microbes, although the path of transmission was not readily identified; and, that, although Detroit had only a few reported cases and more were expected, the disease was not likely to cause many deaths and thus was not seen by experts as a serious threat to public health. The fact that doctors and the *Medical Age* editorial attributed much of the attention to the disease to the influence of newspapers is suggestive of a self-consciousness about the complicated relationship between disease outbreaks and information transmission.

To explore the relationship between information and disease on a larger scale, historians can make use of online tools for text visualisation. The Medical Heritage Library and the Internet Archive make it possible to save the entire text of periodicals such as *Medical Age*. A ten-year run of this journal, including the five years before and five years after the Russian flu, amounts to more than five thousand pages and close to five million words, a quantity of text that would impose a great burden on an individual scholar or even a team attempting a close reading. One way to address this research challenge is through a method, such as the online Voyant tool, which quickly generates a variety of visualisations, tables and other outcomes.

Of these many options, the collocation tool is an easy way to reveal which terms appear in relative proximity to each other. By identifying terms which appear in the same phrases or sentences, this tool suggests more meaningful connections than just the term frequency revealed in a word cloud. Using two keywords related to the Russian flu, influenza and epidemic, indicates that these terms are collocated with each other approximately twenty

⁴ ‘The Prevailing Influenza’, *The Medical Age*, 26 December 1889, 563.

⁵ E. Thomas Ewing, Sinclair Ewing-Nelson and Veronica Kimmerly, ‘Dr Shradly Says: The 1890 Russian Influenza as a Case Study for Understanding Epidemics in History’, *Medical Heritage Library*, posted August 29, 2016.

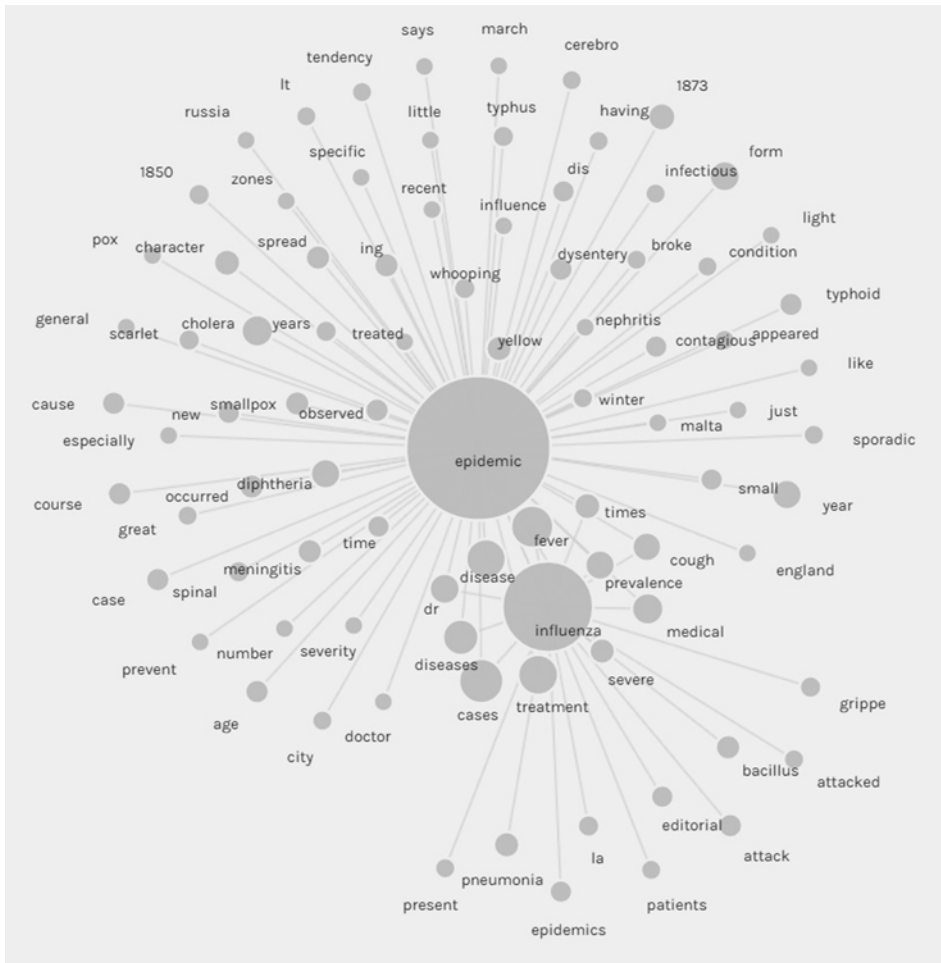


Illustration 1: Collocation Map, Medical Age, 1886–95.

times in the ten years of this journal. While these twenty instances make up a tiny fraction of the entire corpus (0.0008%), a comparison to other disease terms that collocate with epidemic is suggestive of the relative importance of influenza as an epidemic disease. For this purpose, a network mapping tool such as Palladio, available online from Stanford University, reveals terms that connect to both influenza and epidemic as well as those that are linked to only one term or other (Illustration 1). The terms that are linked to both words are suggestive of this historical event; these include diagnostic terms, such as fever, cough and disease, as well as terms indicating the nature of the disease, such as severe and prevalence. By contrast, epidemic is linked to many other diseases, including cholera, typhus and smallpox, while influenza is collocated with pneumonia, grippe and bacillus, all of which reflected efforts to define the medical significance of this disease. Perhaps most interestingly for this project, influenza is collocated with the word editorial seven times over this ten-year period, a pattern suggestive of the important relationship between the spread of the Russian flu and coverage of this epidemic in journals and newspapers.

Collocation is an example of a digital humanities approach suggestive of links and connections that require further research and analysis. The close reading of texts, as modelled in this first part of this article, is an important step for understanding how physicians, newspapers and, indeed, the public understood this epidemic in its earliest stages. Yet text visualisation tools also have great potential to identify important themes, to suggest connections and to identify possible relationships. Researchers can pursue this research on their own using a combination of full text sources in the Medical Heritage Library, text visualisations in Voyant tools and network analysis in Palladio. For students working on medical research projects, these tools combine relative ease of access and applications with the possibility of increasingly sophisticated analytical strategies that yield new insights. This approach allows scholars as well as students to appreciate the value of a digital humanities approach as well as the importance of close-reading skills to explore more fully the historical significance of an event such as an influenza epidemic.

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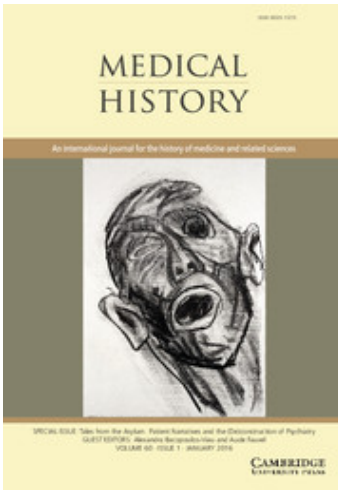
New Methods in the History of Medicine: Streamlining Workflows to Enable Big-Data History Projects

This paper presents new methods, workflows and a project management system that we developed to reduce the resources needed for big-data history projects and thus lower the barriers to entry for other scholars. Creating datasets from handwritten documents – essentially constructing a new archive from which to investigate historical questions – shifts the traditional timeline and resource requirements of historical research. This is a double-edged sword. Once the dataset is built, researchers can use it to investigate a wide range of questions. Yet, building a dataset requires a substantial investment of resources (i.e., knowledge, time, labour and money).

We developed these new approaches, out of necessity, for the New Orleans Mortality Project (<http://nola.spatialhistory.org>), an interdisciplinary historical geographic information systems (HGIS) study of the impact of disease, socio-economics and environment on community and urban development, 1877–1915. First, this paper details the workflows we developed in order to build a 50 000-record mortality database from death certificates, a 40 000-record property value database from tax ledgers and city-wide population datasets from city directories. Second, the paper explains the project management system we created to foster efficient and accurate database creation by undergraduate students. Developing these workflows and project management techniques made the large scope and depth of the project possible. Third, this paper presents the results of this project management approach and discusses the broader implications of these findings. Methodological innovations and lessons from this project can be incorporated into a large variety of other digital history projects.

Like many nineteenth-century administrative records, the state and city death certificates and the Orleans Parish Assessor's records presented two challenges for digitisation: script handwriting and a variety of hands (from different recorders). Advances in optical character recognition (OCR) continue to unlock historical records for further analysis; however, OCR remains severely limited when working with script handwriting. Extensive

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Look Out for ‘La Grippe’: Using Digital Humanities Tools to Interpret Information Dissemination during the Russian Flu, 1889–90

On 28 December 1889, and at the height of global anxiety about a spreading epidemic, the American journal *Medical News* published a lengthy article by Dr Roberts Bartholow about ‘The Causes and Treatment of Influenza’.¹ Noting that the ‘reappearance of influenza in one of its cyclical manifestations, or epidemics, is an interesting event’, Bartholow offered a sweeping statement about the impact of the disease:

Influenza comes suddenly; goes as quickly. The least robust, at any age, and women seem to be the first victims. It is here a question of bodily condition, not of the sex. The large numbers simultaneously attacked attracts general attention, and thus those most impressionable are seized, the onset being facilitated by any depressing emotion like fear or illness.

To treat influenza, Bartholow recommended cures such as sulphurous acid, iodoform, tannin, resorcin, chinoidin, calomel, antipyrin, acetanilide, phenacetin, and more.

This article resembled many contemporary reports about an epidemic already referred to in late 1889 as ‘Russian influenza’ that combined specific descriptions of symptoms with prognostication about the course of disease. Bartholow’s recommended treatments were clearly intended for doctors and druggists rather than the general public, yet his sage

¹¹ <http://wellcomelibrary.org/londons-pulse>.

Research funding was provided by the Virginia Tech Department of History. For comments on earlier versions of this project, the authors wish to thank Madhav Marathe, Stephen Eubank, Samarth Swarup, Meredith Wilson, Ed Fox, Aditya Prakash, Bryan Lewis, and Daniel Sullivan, all from the Virginia Bioinformatics Institute at Virginia Tech, and Jeffrey S. Reznick, from the US National Library of Medicine.

¹ Roberts Bartholow, ‘The Causes and Treatment of Influenza’, *Medical News*, 55, 26 (1889), 710–4.

advice to maintain vital tone and condition obviously appealed to more general readers. Appearing at the early stages of an epidemic, the tone of Bartholow's article was serious yet reassuring in its claims that the disease was cyclical and familiar, its causes soon to be discovered, and its cure within reach.

Although close reading of an illustrative text, such as Bartholow's editorial, allows historians to understand how a medical expert explained a disease outbreak, new tools from the digital humanities permit interpretations on a larger scale, across a broader range of textual evidence, and with the potential to uncover additional angles that promote revealing analysis.² This article explores a digital humanities approach to medical history that takes advantage of the great expansion of texts accessible through digitised collections to facilitate synthetic analysis across layers of experience, from the global to the national and regional, down to the local and even the personal. Digital humanities methods, in other words, allow historians to explore more sources with new tools while also enhancing traditional techniques of close reading and layered analysis.

In terms of a digital humanities approach to medical history, the real significance of Bartholow's article was the manner in which it was replicated, cited and even challenged at a national level. A database search for 'Bartholow', or the frequent misspelling, 'Bartholomew', located more than fifty newspapers over the next ten days that explicitly referenced this expert discussion of influenza.³ Nearly three-quarters of these articles appeared on 28 December 1889, the publication date of the *Medical News* article. These articles consisted almost entirely of text taken from a wire service summary of the journal article, either in a long version of several paragraphs or a short version of a few sentences. The widely held view of the Russian flu as a disease outbreak to be observed, anticipated but not feared, was expressed in, for example, the headline 'Look Out for 'La Grippe', used by a Georgia newspaper, the *Macon Telegraph*, to introduce the main points of Bartholow's article.⁴ In other words, searching through digitised collections reveals the ways iterations of a single text appeared across the United States and gave readers in disparate locations simultaneous access to expert commentary on a disease.

Keyword searching reveals that a few newspapers framed Bartholow's authoritative commentary relative to observations from local physicians, who shared the general assessment of the limited danger of this disease.⁵ Yet a strikingly different, even unique, interpretation of Bartholow's article appeared in a Missouri newspaper, the *Sedalia Weekly Bazoo*, in a 7 January 1890 editorial, which began with a sweeping denunciation of journalistic practice:

² For recent discussions of these techniques in the digital age, see Franco Moretti, *Distant Reading* (London: Verso, 2013); Erez Aiden and Jean-Baptiste Michel, *Uncharted: Big Data as a Lens on Human Culture* (New York: Penguin, 2013).

³ *Aspen Weekly Times*, *Baltimore Sun*, *Boston Daily Journal*, *Chicago Daily Tribune*, *Courier-Journal* (Louisville, Kentucky), *Daily Democrat* (Huntington, Indiana), *Daily Inter Ocean*, *Decatur Herald*, *Evening Star* (Washington, DC), *Fort Wayne Journal Gazette*, *Hartford Courant*, *Herald Democrat*, *Indianapolis Journal*, *Janesville Daily Gazette*, *Kansas City Gazette*, *Knoxville Journal*, *Los Angeles Daily Herald*, *Los Angeles Times*, *Macon Telegraph*, *New York Herald*, *New York Times*, *Oakland Tribune*, *Omaha Daily Bee*, *Pantagraph* (Bloomington, Illinois), *Philadelphia Inquirer*, *Pittsburg Daily Post*, *Pittsburg Dispatch*, *Rocky Mountain News*, *Sacramento Daily Record*, *Salt Lake Herald*, *Springfield Republican*, *St. Louis Republic*, *St. Paul Daily Globe*, *Sun* (New York City), *Times-Philadelphia*, *Times-Picayune*, *Wilmington Messenger*, *Worcester Daily Spy*, 28 December 1889; *Sacramento Daily Record-Union*, 29 December 1889; *The Wheeling Register*, 30 December 1889; *The Globe-Republican*, 1 January 1890; *Abilene Weekly Reflector*; *Barton County Democrat*, 2 January 1890; *The Iola Register*; *The Red Cloud Chief*, 3 January 1890; *Arizona Silver Belt*; *Huntsville Gazette*, 4 January 1890; *The Sedalia Weekly Bazoo*; *The Hocking Sentinel*, 7 January 1890; *The True Northerner*, 7 January 1890.

⁴ *Macon Telegraph*, 28 December 1889.

⁵ See quotations from local doctors in *Chicago Daily Tribune*; *Oakland Tribune*, 28 December 1889.

There seems to be an irresistible pensity, among certain newspaper writers, to try to create panics over the public health. They are never happy unless they can publish stories of fatal epidemic and disastrous plagues . . . Just now these panic-mongers are filling the papers with accounts of the ravages of influenza.

After referring to European hospitals full of patients, businesses and schools closed, and public services curtailed, accompanied by sudden and unexplained increases in mortality, the editorial seemingly mocked alarmist reports of illness in closer proximity: 'In the Eastern States, everybody who has a cold in his head reports himself as a victim of La Grippe, and goes about warning his neighbours to be warned by his melancholy example.' The *Sedalia Weekly Bazoo* then offered its own corrective to stories that 'read like wild fiction, based on a slight substratum of fact': 'There is nothing new in influenza; it is an old acquaintance; we know all about it. It is rarely fatal; it does not usually prevent its victims from attending to business. It sometimes assumes an epidemic type and cases become frequent, but it never lays whole communities low. It has never in its past visitations created a general panic; there is no reason why it should do so now.' Finally, the editorial ended with a sharp retort to the expert advice offered in the *Medical News* ten days earlier: '[The influenza] is probably not nearly so much to be feared as the remedies which Dr Bartholomew [*sic*] of Philadelphia recommends as safeguards: the inhalation of sulphuric-acid gas, five grains of chinoidin three times a day and two grains of calomel at night. A patient who survived these medicines need fear no epidemic in this world.'⁶

The circulation of expert knowledge about influenza involved both repetition and contestation. The *Sedalia Weekly Bazoo* used wire service reports to provide information about the spread of disease in Europe and the United States, yet this editorial challenged both the nature of most newspaper reporting and the specific recommendations of a medical expert. A digital humanities approach that uses broad analytical tools to identify a single text for close analysis offers medical historians a tool to explore tensions between claims of medical expertise and interpretations of human experience.

The Russian influenza, like other nineteenth-century disease outbreaks, is especially suited to a combination of searching across large amounts of texts and close reading of specific texts because of the potential to trace the diffusion of knowledge across communication networks while also carefully evaluating the substance of this information. Medical experts like Bartholow can be tracked by both their names and their ideas, yet this approach requires a combination of tools and techniques. Interpreting specific texts requires the skills of close reading, yet it was the digital humanities tools of word searching and synthetic analysis that identified the texts deserving close interpretation within the broader context. Diseases like influenza epidemics lend themselves to multiple forms of analysis, because the disease can be examined across levels (global, regional, local and personal) as well as across a variety of discursive forms (expert analysis, factual reporting, subjective responses and editorial commentary).

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⁶ *Sedalia Weekly Bazoo*, 7 January 1890.

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**“The Two
Diseases Are So
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(<https://doi.org/10.31835/crdh.2018.12>).

Abstract

The Russian influenza, which first received broad attention in St. Petersburg in November 1889 and spread across Europe and into the Americas over the next two months, occurred at a critical moment in the development of mass journalism, medical knowledge, and information technology. In this context, the question of whether “influenza is the forerunner of cholera” was prompted by a single statement by Russian physician Nikolai Fedorovich Zdekauer, made during a scholarly meeting in St. Petersburg yet quickly disseminated globally through newspapers and medical journals. Tracing the reporting on Zdekauer’s statement reveals how quickly misinformation could be transmitted on a global scale at a time of heightened concern about the threat of widespread disease. Yet these same sources, including newspapers and medical journals, also demonstrate how quickly both the leading authorities in medical science and publications aimed at public audiences questioned these reports and presented authoritative alternatives based on reasoned analysis. Affirming the dissimilarity of influenza and cholera also served

to affirm the value of a public sphere which allowed for measured discussion, thoughtful intervention, and the articulation of an emerging scientific consensus about disease etiology.

On December 15, 1889, the *Omaha Daily Bee* newspaper quoted a French physician, Dr. Albert Robin of the Academy of Medicine, about the possible relationship between the influenza epidemic spreading across Europe and a future outbreak of cholera: "The theory has been advanced that the influenza is the forerunner of cholera, but I regard that as pure nonsense." Robin stated that although at various times "an influenza epidemic has been closely followed by a visitation of the cholera," it is equally true that "several times in the same century there has been an epidemic of influenza with no cholera following, just as there have been epidemics of cholera with no influenza preceding." Robin concluded: "The fact is that the two diseases are so utterly dissimilar as to make any such sequence all but impossible, and any occasional instances of their simultaneous appearance must be regarded as mere coincidences, with no deeper significance in the matter of treatment."¹

Analyzing this statement by Robin using a digital humanities approach can enhance scholarly understanding of significant questions about the functioning of medical networks on a global scale; the relationship between expert knowledge and public understanding; and the role of new technologies in shaping beliefs and attitudes. In this example, an American newspaper quoted a European expert invoking scientific knowledge of how diseases are transmitted in order to reassure the public about a public health threat. Just as the relatively new technologies of global news reporting by transoceanic cables allowed for rapid transmission of information on a global scale in 1889, the availability of digitized

collections of newspapers with full text search capacity allows the historian to quickly and thoroughly track the spread of information on a global scale. Locating the article cited here from the *Omaha Daily Bee* through a keyword proximity search of digitized newspapers is an example of how digital humanities tools have transformed historical analysis.² The Russian influenza, which first received broad attention in St. Petersburg in November 1889 and spread across Europe and into the Americas over the next two months, occurred at a critical moment in the development of mass journalism, medical knowledge, and information technology, as the telegraph allowed news to spread faster than diseases at the same time that bacteriological research revealed distinct paths of contagion.³ The fact that a daily newspaper in Nebraska published an interview with a French scientist was very common in this historical context where public discourse included extensive international reporting on medical topics. Yet Robin's dismissal as "pure nonsense" the prediction that influenza would lead to cholera raises historical questions best addressed through methods of close reading, contextual analysis, and layered interpretation.

In fact, this question of whether "influenza is the forerunner of cholera" was prompted by a single statement by Russian physician Nikolai Fedorovich Zdekauer.⁴ As reported in the St Petersburg daily newspaper, *Novoe Vremia*, on November 18 [29], 1889, Zdekauer told the Society for the Improvement of Public Health that influenza could be followed by an even greater threat to public health:

With great interest those in attendance listened to the opinion of the authoritative scientist, prof. N. O. Zdekauer, who appeared in the middle of the symposium. Prof. Zdekauer notes that influenza on its own is not dangerous, but there are circumstances that make it necessary to think seriously about influenza. During his many years, he lived through 4 choleras and each of these choleras were preceded by influenza and it is possible to imagine that this epidemic is a precursor to that cholera that comes to us from Asia. Moving from Turkey to Syria, Mesopotamia, this cholera is now coming from Persia. There are suppositions that the influenza microbe, having survived the winter in our soil, may develop into cholera in the spring. In this consideration, warned Zdekauer, we need to pay attention to improving the health of the city, as the experiences of 1830, 1848, 1865, and 1884 show that even a quarantine does not guarantee the end of cholera. The most recent choleras develop most of all in Spain and Italy, countries with more positive conditions in terms of sanitation. Cholera almost never appears in England, a country with excellent sanitary conditions.⁵

The potential impact of this comment became evident in the first international report published on December 2, 1889 in the *London Standard*:

At the meeting yesterday of the Russian Association for the Preservation of the Public Health, Professor Zdekaner [sic], the first authority in Russia, said he had witnessed five epidemics of cholera, each of which was preceded by an epidemic of influenza such as that now raging. He considered it highly probable that the present disease would be succeeded by cholera next Spring. He called on the authorities, therefore, to undertake at once such sanitary measures as had led to such excellent results in England.⁶

On the same day, the *St. Paul Daily Globe* offered a slightly abbreviated report under the ominous headline, "Forerunner of Cholera": "Prof. Zdenecker [sic], one of the leading Russian medical authorities, declares his belief that the influenza now prevailing here is a forerunner of cholera. The same signs, he says, preceded the last five cholera epidemics here."⁷

Tracking term frequency in digitized newspaper collections (see figures 1-4) clearly indicates how Zdekauer's statement changed reporting on the relationship between these two diseases. Whereas the two terms rarely appeared in the same sentence, paragraph, or phrase prior to December 1889, suggesting the two diseases were not seen as connected, the impact of Zdekauer's statement and subsequent responses could be seen in the marked increase in results of proximity searches across newspaper titles. Keyword searches can document continuity and change, two key issues for historical scholarship, but they do not reveal meaning or demonstrate causation. Close reading reveals that many newspapers and medical journals actually challenged Zdekauer's

statement. On December 3, 1889, *The Times* of London offered a sweeping denial of remarks that the same newspaper had reported one day earlier:

The suggestion, however, which has been attributed to Professor Zdeckauer [sic], to the effect that the epidemic now existing in Russia is probably premonitory of cholera in the spring, is one which appears to derive no support from either reason or experience. The two diseases are totally unlike one another, and probably the only recorded coincidence between them, even in point of time, is that, as already mentioned, influenza followed soon after cholera in the country in 1833.

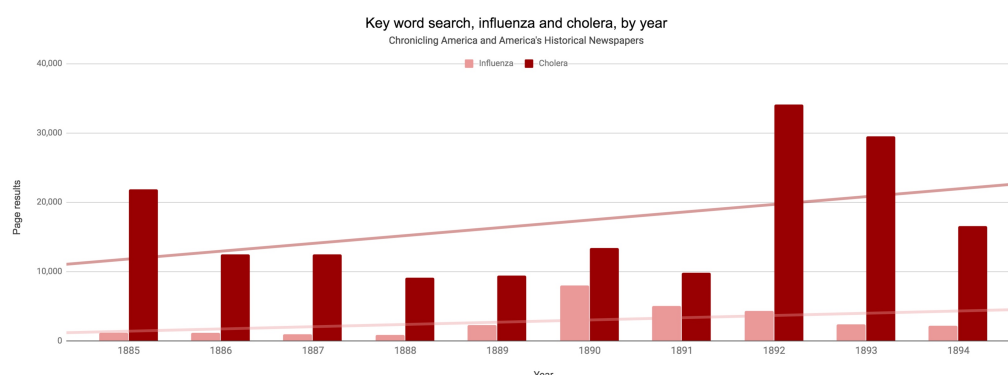


Figure 1. This chart shows the distribution of search results for two keywords, influenza and cholera, in two newspaper collections, Chronicling America and America's Historical Newspapers, by year, from 1885 to 1894. The chart indicates that the term cholera appeared on more pages in every year than the term influenza, although the gap was narrowest in 1890, which included the peak of Russian flu coverage in January. The spike in cholera results in 1892 certainly resulted

from the outbreak of this disease in the Middle East, Russia, and Europe.

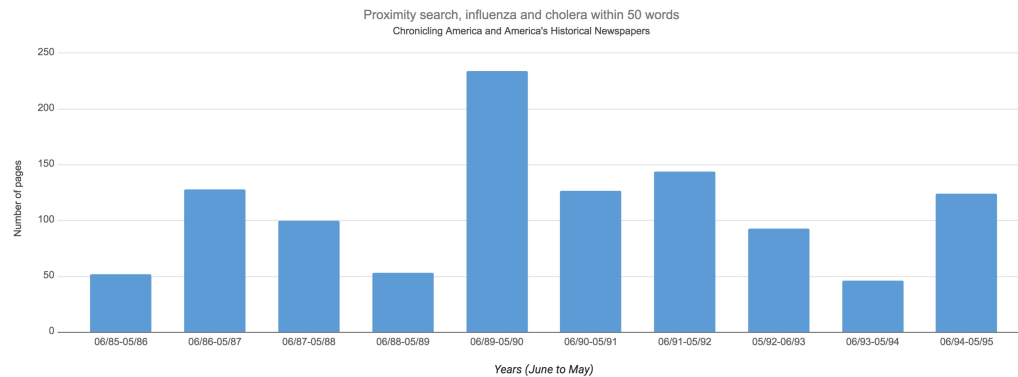


Figure 2. This chart uses the tool of proximity search to identify pages on which the two terms, influenza and cholera, appeared within 50 words of each other in Chronicling America and America's Historical Newspapers. This tool suggests changes over time in how these terms were collocated on these pages; this tool does not, however, suggest interpretations of the meanings of these collections. By adjusting the yearly segments to begin in June and end in May, this chart illustrates the significant increase in reporting in late 1889 and early 1890 associated with the Russian Flu, thus providing a more accurate visualization of change over time.

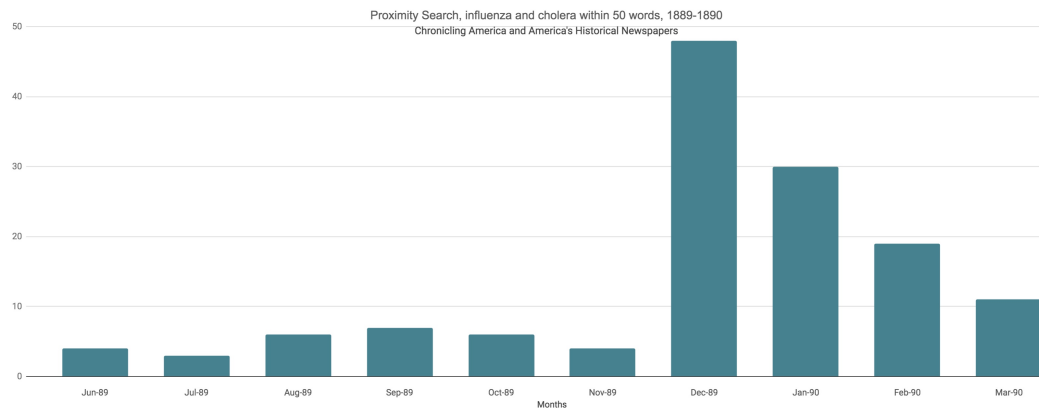


Figure 3. This chart compares proximity searches for influenza and cholera within fifty words in two databases, *Chronicling America* and *America's Historical Newspapers*, by month in the year from June 1889 to May 1890. Comparing results by month indicates how much of a change can be seen in December 1889, immediately following the widely reported statement by Zdekauer. The very low number of results from June to November suggest that the lack of significant connections between these two terms, by contrast not only to December 1889 but even to the continued collocation of these terms through the spring of 1890.

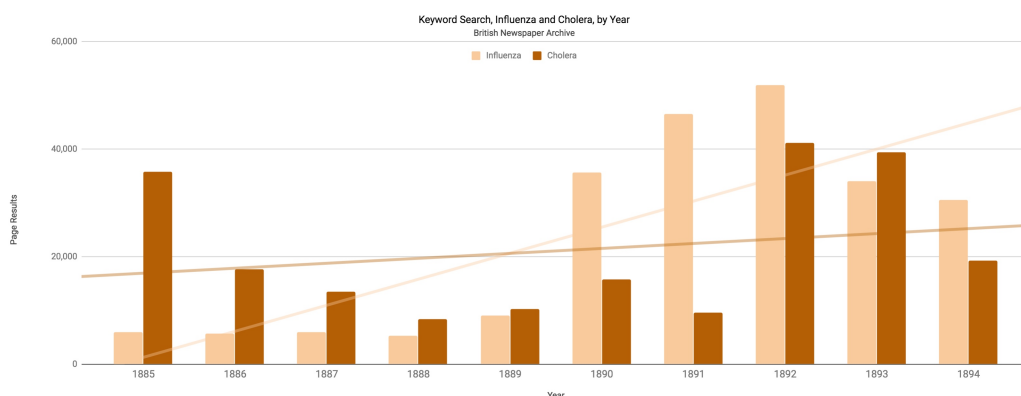


Figure 4. As a way to compare results across national newspaper collections, this chart shows the results of keyword

searches for influenza and cholera in the British Historical Newspaper collection, a commercial database of digitized newspapers. In this collection, cholera appeared more frequently than influenza from 1885 to 1889 and again in 1893 while influenza appeared more frequently in 1890–1892 and 1894. This chart shows different results than figure 1 for American newspapers. While the British results were probably affected by the greater impact of the 1892 influenza in Britain, as compared to the United States, it is more likely that these results reflected the frequency of advertising terms, which requires a whole different method to parse.

This challenge was articulated in a most authoritative way by the *British Medical Journal* on December 7, 1889: “The theory which has again been given currency in the telegrams from St. Petersburg that epidemic influenza is a forerunner of cholera need only be mentioned in order that it may be condemned as utterly unfounded.” While influenza and cholera epidemics may occur in chronological proximity, the pattern “has abundantly proved that there is no kind of causal connection.”⁸ In the United States, the *Medical Record* offered an equally sweeping statement in a front-page editorial on December 14, 1889:

We observe that some feeling of alarm prevails lest this epidemic be a precursor to cholera, as was the case in 1831 and 1847. There have been, however, plenty of cholera epidemics without a preceding influenza, and a great many influenza epidemics without any associate cholera. The micro-organisms of the two diseases are as essentially different as are the diseases themselves. The cholera germ lives in water and soil, the influenza germ in the air. The relationship between the two diseases has been, we believe, purely accidental.²

Newspapers also cited the opinions of doctors, either individually in interviews¹⁰ or as the collective view of the profession, as in this *New Haven Register* article on December 14, 1889:

One reason why this disease is dreaded is because it is thought by many to be a sure forerunner of Asiatic cholera. This is based upon the fact that some previous outbreaks of this sort have been followed by the dread visitation of cholera. The best physicians are not entirely agreed upon the subject, but perhaps the balance of opinion is in favor of the belief that the two diseases are in no way connected. We have no more reason to fear an outbreak of the cholera now than ever before.

This statement, “the two diseases are in no way connected” acknowledges the difference between causation and correlation: doctors agreed that the two diseases were not causally connected, in the sense that influenza could not cause cholera nor were the causes of the two diseases at all similar. As this review of evidence clearly suggests, however, the two diseases were

connected because they were part of the medical imagination of the era and thus appeared in proximity to each other in newspapers, journals, and doctors' public statements.¹¹

Zdekauer was aware of how his statement had been misinterpreted and tried to correct the record. On December 3 (15), 1889, the Russian newspaper *Novoe Vremia* published his letter claiming that his remarks "had been misrepresented in the press." Zdekauer denied that he had claimed any organic connection between the two diseases, but he affirmed instead the goal of raising concerns about cholera with the intention of prompting the Society and government to implement sanitary measures, which were described in some detail in the rest of the letter.¹² Through this public appeal, Zdekauer engaged with debates prompted by misinterpretations of his comments which had been reproduced, questioned, and repudiated on a global scale.

This study of reports about causal relationships between influenza and cholera builds upon, but also challenges, the analysis of viral texts published by Ryan Cordell in an influential article in *American Literary History*.¹³ Drawing on the materials and methods associated with the Viral Texts digital humanities project, Cordell makes extensive use of digitized newspapers to explore the "networks of information exchange" created, sustained, and broadened by selection and republication of texts. Cordell introduces the concept of "network author" to illustrate "the ways in which meaning and authority accrued to acts of circulation and aggregation" across mid-nineteenth century American newspapers. Using Cordell's analytical framework suggests that references to cholera and influenza were "textual clusters," similar to those identified by the Viral Texts algorithm, but in this case, identified through proximity searches across databases. Brief news reports from St. Petersburg, warnings about possible cholera outbreaks, and repudiation by medical experts of these warnings

were examples of textual exchange that linked mass circulation newspapers, medical periodicals, and individual doctors and researchers as “information brokers,” again using Cordell’s suggestive terminology. An analysis of the complex relationship between cholera and influenza requires, as suggested by Cordell’s research, an appreciation of the potential of the digitized archive to suggest connections in ways that can transform interdisciplinary research.

This study also confirms the arguments of Christopher Hamlin’s *Cholera. The Biography* about the distinctive ways cholera connected expert, political, and popular discourses about health, culture, and community.¹⁴ Hamlin’s research is especially productive in its examination of how broad claims about cholera were often based on limited, doubtful, and even non-existent evidence. Newspaper editorials and even doctors made frightening predictions of future cholera outbreaks based on repeated reporting about a single, mostly misunderstood, statement from a Russian physician, just as Hamlin’s examples show that most published reports about cholera perpetuated a simplified version of the disease that served rhetorical purposes yet were often far removed from medical analysis.

Focusing on the discussion of whether influenza was causally related to cholera is a way to understand how researchers understood etiology in 1889, how knowledge circulated between expert and public audiences, and how information was disseminated globally, regionally, and locally. A doctor’s public statements, a wire service report published in newspapers, and editorials in medical journals are representations to be examined as a way to understand these broader processes. Whereas recent scholarship in digital humanities has suggested new and potentially transformative arguments for the value of network analysis for understanding authorship and readership, this study argues that

historians need to go further to ask how practices of republication also contained elements of validation, correction, and even repudiation. Research on the circulation of medical knowledge requires more than the identification of clusters in order to understand how the public, newspapers, and medical experts made sense of a new threat to public health and sought to communicate this understanding to expert and public audiences. This study also contributes to new perspectives in digital history by examining a situation where a Russian scholar participated in the scientific debate—not as an exotic representative of the Other, but as a highly qualified expert—whose expertise made it worthwhile to offer a reasoned critique.

In spring 1892, just two years later, a devastating cholera epidemic struck Russia, causing more than 250,000 deaths, and prompting health officials to acknowledge that unsanitary living conditions, particularly lack of clean water, contributed to high case and death rates.¹⁵ In other words, the 1892 cholera outbreak validated demands for preventive measures raised by Zdekauer during the 1889 influenza outbreak. In fact, following Zdekauer's death in early 1897, the *British Medical Journal*, which had adamantly denounced any connection between influenza and cholera, offered a belated concession: "It will be remembered that when influenza appeared in Russia in the autumn of 1889, Zdekauer was strongly of the opinion that an epidemic of cholera might be expected to follow, a view which was justified by subsequent events."¹⁶

For historians, understanding the significance of Zdekauer's statement requires both the large scale searching and sorting available from digitized collections and the close reading and contextual interpretation necessary for critical analysis. While the sensationalist nature of the popular press as well as the scientific concerns of the medical press combined to bring global attention to a remark made at one meeting in St. Petersburg, these same

sources also enable the historian to interpret the purpose and meaning of these remarks in their context. Tracing the reporting on Zdekauer's statement reveals how quickly misinformation could be transmitted on a global scale at a time of heightened concern about the threat of widespread disease. Yet these same sources, including newspapers and medical journals, also demonstrate how quickly both the leading authorities in medical science and publications aimed at public audiences questioned these reports and presented authoritative alternatives based on reasoned analysis. Affirming the dissimilarity of influenza and cholera also served to affirm the value of a public sphere which allowed for measured discussion, thoughtful intervention, and the articulation of an emerging scientific consensus about disease etiology.

Bibliography

Bresalier, Michael. "'A Most Protean Disease': Aligning Medical Knowledge of Modern Influenza, 1890-1914." *Medical History* 56, no. 4 (2012): 481-510.

British Newspaper Archive.

<https://www.britishnewspaperarchive.co.uk/>
(<https://www.britishnewspaperarchive.co.uk/>).

Chronicling America. Historic American Newspapers from the Library of Congress. <https://chroniclingamerica.loc.gov/>
(<https://chroniclingamerica.loc.gov/>).

Clemow, Frank. *The Cholera Epidemic of 1892 in the Russian Empire*. London: Longmans, Green, and Co., 1893.

Cordell, Ryan. "Reprinting, Circulation, and the Network Author in Antebellum Newspapers." *American Literary History* 27, no. 3 (2015): 417-445.

"Epidemic Influenza." *British Medical Journal* 2, no. 1521, (December 7, 1889): 1290-1291.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2155969/>
(<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2155969/>)

"Epidemic Influenza." *The Medical Record* 36, no. 24, (December 14, 1889): 661.

<https://archive.org/stream/medicalrecord06conggoog#page/n671/mode/2up>
(<https://archive.org/stream/medicalrecord06conggoog#page/n671/mode/2up>).

Ewing, E. Thomas. "'Will It Come Here?' Using Digital Humanities Tools to Explore Medical Understanding during the Russian Flu Epidemic, 1889-90," *Medical History* 61, no. 3 (July 2017): 474-477.

Ewing, E. Thomas, Sinclair Ewing-Nelson, and Veronica Kimmerly. "Dr. Shrady Says: The 1890 Russian Influenza as a Case Study for Understanding Epidemics in History." *Medical Heritage Library Research Blog*, August 2016,

<http://www.medicalheritage.org/2016/08/29/dr-shrady-says-the-1890-russian-influenza-as-a-case-study-for-understanding-epidemics-in-history/>
(<http://www.medicalheritage.org/2016/08/29/dr-shrady-says-the-1890-russian-influenza-as-a-case-study-for-understanding-epidemics-in-history/>).

Ewing, E. Thomas, Veronica Kimmerly and Sinclair Ewing-Nelson. "'Look Out for La Grippe': Using Digital Humanities Tools to Interpret Information Dissemination during the Russian Flu, 1889-1890." *Medical History* 60, no. 1 (January 2016): 129-131.

Frieden, Nancy. "The Russian Cholera Epidemic, 1892-1893, and Medical Professionalization." *Journal of Social History* 10, no. 4 (1977): 538-559.

Hamlin, Christopher. *Cholera. The Biography*. Oxford: Oxford University Press, 2009.

Honigsbaum, Mark. *A History of the Great Influenza Pandemics. Death, Panic, and Hysteria, 1830-1920*. London: I. B. Tauris, 2014.

Mussell, James. "Pandemic in print: the spread of influenza in the Fin de Siècle." *Endeavour* 31, no. 1 (March 2007): 12-17.

"St. Petersburg. Death of Professor Zdekauer." *British Medical Journal*, 1, no. 1885, (February 13, 1897): 428.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2432980/?page=3>

(<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2432980/?page=3>).

Notes

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1. The same comments from Dr. Albert Robin also appeared in the *Omaha Daily Bee* (<https://chroniclingamerica.loc.gov/lccn/sn99021999/1889-12-15/ed-1/seq-1/>), December 15, 1889, 1; *Evening Star* (<http://chroniclingamerica.loc.gov/lccn/sn83045462/1889-12-17/ed-1/seq-9/>) (Washington DC), December 17, 1889, 1; ten days later, in the *Iowa County Democrat*

(<https://chroniclingamerica.loc.gov/lccn/sn86086852/1889-12-27/ed-1/seq-1/>), December 27, 1889, 1; and another week later, in the *Wood County Reporter* (<https://chroniclingamerica.loc.gov/lccn/sn85033078/1890-01-02/ed-1/seq-5/>), January 2, 1890, 5. ↩

2. This article was located with a proximity search tool that found approximately fifty pages in the Library of Congress Chronicling America database with the terms “influenza” and “cholera” within 50 words of each other during December 1889, the month when the Russian influenza first attracted global newspaper coverage. More results can be found by accessing commercial databases, including Proquest Historical Newspapers, America’s Historical Newspapers, and newspapers.com, although the overlap between these collections complicates efforts to quantify and compare results. This search function is much more efficient than reading through thousands of newspaper pages to find articles that may have addressed the connection between these two diseases. In fact, nearly all of the results from this search technique were articles, editorials, or other reports about the possible relationship between these two diseases, with just a few examples that did not make this connection. The fifty pages with both terms in proximity marked just 6% of the nearly 900 pages with the term influenza during this same time period in the same digitized collection. Yet knowing how to set up the proximity search using the right keywords and data parameters depends on an understanding of the distinctive historical context as well as the identification of the right questions. ↩
3. Bresalier, “‘A Most Protean Disease’ 481-510; Honigsbaum, A *History of the Great Influenza Pandemics*; Mussell, “Pandemic in print,” 12-17; Ewing, Kimmerly and Ewing-Nelson, “‘Look Out for La Grippe’,” 129-131; Ewing, “‘Will It Come Here?’,” 474-477. ↩

4. *Novoe Vremia*, November 18 (30), 1889, 3. Nikolai Fedorovich Zdekauer was born in 1815, entered the medical faculty at St. Petersburg University in 1831, and became a professor after completing his Doctor of Medicine degree in 1842. In the 1860s, he led Russian efforts to investigate the cholera outbreak, which led to recommendations to implement sanitary measures. In 1878, he became the first president of the first Russian National Health Society, he was appointed a foreign honorary member of the Epidemiological Society of London, and he served as family physician to Tsar Alexander II. He remained active in medical societies until his death in 1897. Biographical information comes from the obituary published in the *British Medical Journal*, "St. Petersburg. Death of Professor Zdekauer," 428, as well as the detailed entry in the Russian Wikipedia: [Здекауер, Николай Фёдорович, Материал из Википедии — свободной энциклопедии](https://ru.wikipedia.org/wiki/%D0%97%D0%B4%D0%B5%D0%BA%D0%B0%D1%83%D0%B5%D1%80,%D0%9D%D0%B8%D0%BA%D0%BE%D0%BB%D0%B0%D0%B9_%D0%A4%D1%91%D0%B4%D0%BE%D1%80%D0%BE%D0%B2%D0%B8%D1%87) (https://ru.wikipedia.org/wiki/%D0%97%D0%B4%D0%B5%D0%BA%D0%B0%D1%83%D0%B5%D1%80,%D0%9D%D0%B8%D0%BA%D0%BE%D0%BB%D0%B0%D0%B9_%D0%A4%D1%91%D0%B4%D0%BE%D1%80%D0%BE%D0%B2%D0%B8%D1%87). As will be seen in this chapter, the name **Здекауеръ** was printed in many different spelling variations, which further complicates the use of text search tools to trace the spread of these reports. ↩
5. The difference with the Russian calendar was 12 days, so the conference was November 17 (29), 1889. Russian newspapers included both dates on their front page. An article published on November 19 (30), in the Moscow newspaper, *Moskovskie vedomosti*, offered a mostly similar report about Zdekauer's statement—but made no mention of the claim that the influenza microbe could develop into cholera. ↩

6. London Evening Standard

(<https://www.britishnewspaperarchive.co.uk/viewer/bl/0000183/18891202/041/0005>), December 2, 1889, 5. ↩

7. Similar reports, with various spellings of the doctor's name, appeared on Los Angeles Daily Herald

(<https://chroniclingamerica.loc.gov/lccn/sn85042460/1889-12-02/ed-1/seq-7/>), December 2, 1889, 7 (Zoeker); St. Paul Daily Globe

(<https://chroniclingamerica.loc.gov/lccn/sn90059522/1889-12-02/ed-1/seq-4/>), 4 (Zdenecker); Omaha Daily Bee

(<https://chroniclingamerica.loc.gov/lccn/sn99021999/1889-12-02/ed-1/seq-3/>), 3; Deseret Evening News

(<https://chroniclingamerica.loc.gov/lccn/sn83045555/1889-12-02/ed-1/seq-4/>), 4 (Zedsaner); Indianapolis Journal

(<https://chroniclingamerica.loc.gov/lccn/sn82015679/1889-12-02/ed-1/seq-1/>), 1; Waterbury Evening Democrat

(<https://chroniclingamerica.loc.gov/lccn/sn94053256/1889-12-02/ed-1/seq-4/>), 4; and The Sun

(<https://chroniclingamerica.loc.gov/lccn/sn83030272/1889-12-02/ed-1/seq-2/>), 2 (all spelled Zdekaner). ↩

8. "Epidemic Influenza," *British Medical Journal*, 1290-1291. ↩

9. "Epidemic Influenza," *Medical Record*, 661. Further amplifying this dismissal, Dr. Shrady, editor of the *Medical Record*, was quoted in an interview published in the *Evening World*, on December 13, 1889: "Dr. Shrady recalls epidemics of influenza in 1847 and 1866, but each time followed by cholera, but he says: "That was a coincidence, I think. I do not think there was any connection between the two, and I apprehend no trouble to New York from cholera now. The city is too well fortified against cholera." Evening World

(<https://chroniclingamerica.loc.gov/lccn/sn83030193/1889-12->

[13/ed-1/seq-1/](#)), December 13, 1889, 1. For more on Dr. Shrady's significance during the Russian influenza, see Ewing, Ewing-Nelson, and Kimmerly, "Dr. Shrady Says." Similar dismissals were voiced by medical experts both nationally and regionally in the days that followed. On December 14, 1889, the *Salt Lake Herald* published an interview with Dr. Louis Sayer, another New York physician with a national reputation, who similarly drew upon his memories of recent outbreaks to clearly differentiate between the two diseases: "My advice is that when it comes don't get scared. Trust to Providence and keep you powder dry, as it were, by keeping up courage while you relieve your misery and preserve your strength as much as possible. Go slow, take it easy, take good care of yourself, and you will have done all you can to lessen the misery. From influenza, or its subsequent results, the suggestion that it is liable to be followed by cholera is nonsense. I anchored cholera in the bay when it visited this country last, and it can be kept out without any trouble." *Salt Lake Herald*
(<https://chroniclingamerica.loc.gov/lccn/sn85058130/1889-12-14/ed-1/seq-1/>), December 14, 1889, 1. ↩

10. In a *Pittsburg Dispatch* article published December 17, 1889, Dr. William Pepper from the University of Pennsylvania reviewed the symptoms of influenza, and ended with this summary statement: "There is, therefore, no ground whatever for alarm about a possible outbreak of cholera. The two diseases have nothing whatever in common, and the intestinal type of influenza does not present any greater danger than the resperator type."
Pittsburg Dispatch
(<https://chroniclingamerica.loc.gov/lccn/sn84024546/1889-12-17/ed-1/seq-1/>), December 17, 1889, 1. ↩


11. One interesting feature of this discussion, however, was the tendency to suggest that the public continued to believe in a connection between these diseases, despite the repeated affirmations of medical experts. *The New York Times* on December 10, 1889 warned: "It is the popular belief in Europe that the present epidemic of influenza is the forerunner of an epidemic of Asiatic cholera...While there is no direct connection between the influenza epidemic and a visitation of the cholera, there is at the present time great danger of the appearance of cholera in Europe, because it is already prevailing in the region just east of the eastern extremity of the Mediterranean." *The New York Times* (<https://timesmachine.nytimes.com/timesmachine/1889/12/10/issue.html>), December 10, 1889, 4. Yet newspapers themselves contributed to the persistence of these claims. On December 28, 1889, the *Pittsburg Dispatch* published an editorial that repeated the claims attributed to Dr. Zdekauer almost a full month after his comments had been widely repudiated by newspapers, journals, and doctors: "One of the most unpleasant suggestions in regard to the influenza epidemic is that it is in some way connected with cholera, and is frequently a forerunner of it. A skillful Russian specialist on both diseases, Prof. Zehekaner [sic], favors this view. But his argument and those of his followers only prove that certain atmospheric conditions favor both diseases. We of this latitude have a liking for a cold winter, and if it is needed to keep cholera away from us next summer our prayer is for frost and lots of it." *Pittsburg Dispatch* (<https://chroniclingamerica.loc.gov/lccn/sn84024546/1889-12-28/ed-1/seq-4/>), December 28, 1889, 4. Some newspaper reports attempted to explain why this erroneous belief persisted—even among members of the medical profession, as in this analytical article in the *Pittsburg Dispatch* on January 5,

1890. After stating that influenza “runs across the country from southeast to northwest, as cholera does,” the article stated that influenza often moved against the prevailing air currents yet could travel quite far in a short period of time, leading to this broad analytical statement: “This remarkable faculty it has of traveling so rapidly as against the general course of the air makes it resemble cholera, and from the fact that it has on two occasions been followed during the next summer by cholera, some wise physicians have had an idea that it might be followed by the same disease next summer. It follows no more than smallpox follows whooping cough.” *Pittsburg Dispatch* (<https://chroniclingamerica.loc.gov/lccn/sn84024546/1890-01-05/ed-1/seq-16/>), January 5, 1890, 16. ↵
12. *Novoe Vremia*, December 3 (15), 1889, 3. ↵
13. Cordell, “Reprinting, Circulation, and the Network,” 417–445. ↵
14. Hamlin, *Cholera. The Biography*. ↵
15. Clemow, *Cholera Epidemic of 1892*. The cholera outbreak prompted Russian physicians to take an increasingly active, visible, and public role in advocating for effective measures such as improved sanitation, consistent quarantines, and health education. Frieden, “Russian Cholera Epidemic, 1892–1893.” 538–559. ↵
16. “St. Petersburg. Death of Professor Zdekauer,” 428. ↵
-

Appendix

- [Data archive \(http://crdh.rrchnm.org/appendices/ewing-v01/ewing-influenza-cholera-data.numbers\)](http://crdh.rrchnm.org/appendices/ewing-v01/ewing-influenza-cholera-data.numbers)
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**Roy Rosenzweig Center
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(<https://rrchnm.org>) 

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Abschlussbericht

1 Allgemeine Angaben

- DFG-Geschäftszeichen
 - **NE 638/13-1**
- Antragsteller
 - **Prof. Dr. Wolfgang Nejdl**
- Institut/Lehrstuhl
 - **L3S Research Center, Department for Electrical Engineering and Computer Science, Leibniz Universität Hannover**
- Thema des Projekts
 - **Tracking the Russian Flu in U.S. and German Medical and Popular Reports, 1889-1893**
- Berichtszeitraum, Förderungszeitraum insgesamt
 - **15.4.16 - 30.6.18**
- Liste der wichtigsten Publikationen aus diesem Projekt
 - Arbeiten, die in Publikationsorganen mit einer wissenschaftlichen Qualitätssicherung zum Zeitpunkt der Berichterstellung erschienen oder endgültig angenommen sind, in fachüblicher Gliederung; Buchveröffentlichungen. Im Falle noch nicht erschienener aber bereits zur Veröffentlichung angenommener Arbeiten sind das Manuskript und die Annahmebestätigung des Herausgebers beizufügen
 - **Tran Van Canh, Katja Markert, Wolfgang Nejdl:**
A Framework For Historical Russian Flu Epidemic Exploration From German Newspapers.
Digital Humanities 2017
 - **Tran Van Canh, Katja Markert, Wolfgang Nejdl:**
RussianFlu-DE: A German Corpus for a Historical Epidemic with Temporal Annotation. Best Paper Award.
21st International Conference on Theory and Practice of Digital Libraries 2017: 61-73.
 - **E. Thomas Ewing, Sinclair Ewing-Nelson, and Veronica Kimmerly, Dr. Shrady Says: The 1890 Russian Influenza as a Case Study for Understanding Epidemics in History. Medical Heritage Library Research Blog. August 29, 2016 (part 1) ([link](#))**
 - **E. Thomas Ewing, Sinclair Ewing-Nelson, and Veronica Kimmerly, Dr. Shrady Says: “The Epidemic of Influenza” as an Editorial Intervention. Medical Heritage Library Research Blog. September 12, 2016 (part 2) ([link](#))**
 - **E. Thomas Ewing, Sinclair Ewing-Nelson, and Veronica Kimmerly, Dr. Shrady Says: The National Impact of Shrady’s**

2 Ausgangsfragen und Zielsetzung des Projekts

This project examines US and German medical discussion and popular reporting during the Russian influenza epidemic, from its outbreak in late 1889 through the successive waves that lasted through 1893. A world-wide epidemic can be studied at every level from the microbial through the individual, communal, regional, national, and global. Digital humanities are especially suited for this kind of scalable analysis, as the close reading techniques familiar to humanities scholars are integrated with the large-scale interpretive methods of computer scientists and information scholars. The project will use historical materials to develop, apply, and evaluate new methods for computational epidemiology through applications such as word and term distribution analysis, fact extraction, sentiment analysis, network analysis and data visualization.

This project develops innovative methods by exploring research questions that connect themes central to humanities inquiry with the opportunities and challenges presented by the availability of digitized texts and advances in computational analysis:

1. How does the tone of reporting during a disease outbreak change in relation to variables such as proximity to reporting location, number of cases, categories of victims, and accumulating deaths?
2. How did newspapers and medical journals contribute to the narrative of the Russian flu, including the recognition of an outbreak, involvement of medical experts, attention to celebrity victims, the effort to shape public opinion, scope of opinions, and the response of authorities?
3. How accurate were predictions about the scope, impact, and significance of the Russian flu at distinct stages, by comparison to epidemiological data reported during and after the outbreak?

The data sources include both popular newspapers and medical journals from the United States, Germany, Austria, Switzerland, and Russia, in both English and German languages. Digitized newspapers allow for tracking of the disease as it spreads, as well as evidence of the ways that expert medical knowledge was disseminated to public audiences. Digitized medical journals make it possible for computational methods to be applied to detailed reports about disease symptoms, public health responses, and transmission patterns. This project is thus unique among digital humanities projects by bringing together two distinctive approaches: first, the integration of popular newspaper reporting and expert medical analysis of the same disease outbreak, and second, developing analytical tools for source materials in two languages (English and German) to illustrate the nature of the transnational medical dialogue that also engaged with popular reporting on a global scale.

The Russian Influenza is an especially appropriate case study for an approach that integrates the digital humanities and computational analysis. With the establishment of the global telegraph network, for the first time in world history, news about a disease could spread across long distances faster than the disease itself, which was limited by the speed of human travel. At this same time, medical discoveries were transforming both scholarly and public opinion about disease origins, transmission, and prevention. In this context of relative

international calm, at least among the great powers, transnational communication, particularly between the United States and Germany, was facilitated by both the increased speed of electronic communications and a shared perception of the advantages of sharing scholarly insights. Finally, the Russian influenza is an excellent case study because although it had a relatively low mortality rate, it spread quickly and infected high proportions of the population in each region it reached, thus allowing for mapping of the spread of disease using popular and medical reporting. This project will interest humanities scholars seeking new ways to understand popular and scientific perceptions of disease, epidemiologists studying the spread of infectious epidemics in global contexts, and data analysts seeking to track, measure, and predict the spread of information about disease outbreaks and public health responses.

3 Entwicklung der durchgeführten Arbeiten einschließlich Abweichungen vom ursprünglichen Konzept, ggf. wissenschaftliche Fehlschläge, Probleme in der Projektorganisation oder technischen Durchführung

The Russian Flu project was granted on 21.05.2015. At the start of the project, the L3S and Virginia Tech teams met virtually to design strategies to address the research questions, identify data sources, resolve challenging issues, and develop strategies for reporting results.

At the L3S (Leibniz University Hannover), Tran Van Canh started his work on the project on 01.04.2016, and worked on a large corpus of German and Austrian newspapers during the time of the Russian Flu epidemic provided by the Austrian National Library (ANNO), which contained high resolution scans of the original newspapers as well as corresponding OCR files, i.e. automatically recognized text. The creation of a news corpus containing relevant articles about the Russian flu, extracted from newspapers that were published during the time of the epidemic, was a useful and essential first step, as all further analysis to be performed later on requires the corrected, plain text of the articles.

However, after initial assessment, the work on the provided newspapers proved to be a lot more challenging than expected due to several difficulties: On one hand, due to their age, the ink had already started to fade when they were scanned. On the other hand, the alphabet and corresponding calligraphic hand ("Fraktur") used in Germany and Austria at the time cannot be recognized as easily by OCR tools as current fonts. This resulted in a lot of errors in the text produced by the OCR software, which had to be corrected before continuing.

We therefore decided to put more work than initially proposed into a tool, which was used to perform important pre-processing on the corpus, improving the OCR documents

considerably by allowing for human input into the process, and provided an interactive interface to aid the (semi-manual) cleaning process to recommend relevant articles and paragraphs and to explore the collection. This work took about one year and has been described in a paper at the Digital Humanities Conference (DH) 2017 in Montreal, Canada, and the Digital Libraries Conference (TPDL) 2017 in Thessaloniki, Greece. Tran Van Canh left end of October 2017, to start a job in industry.

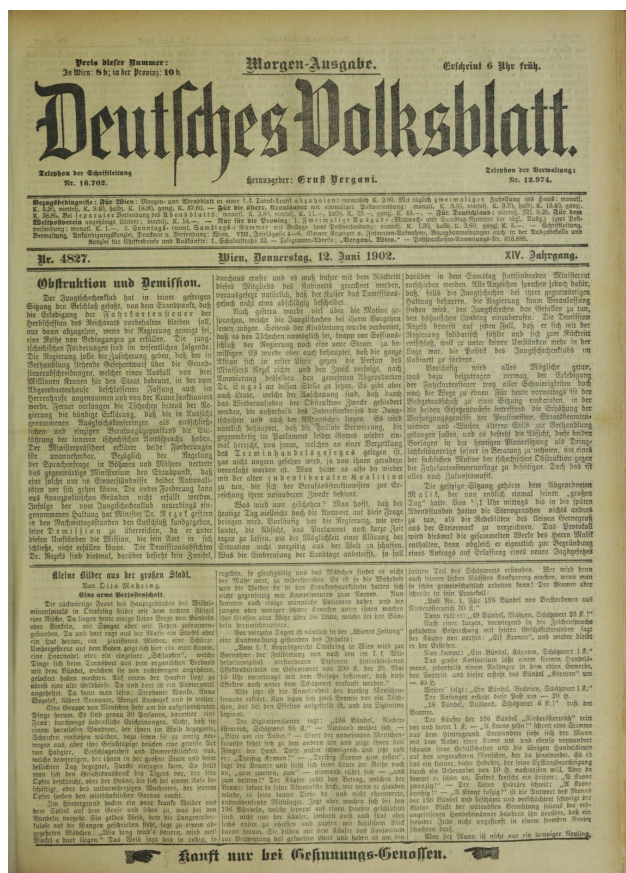
The Virginia Tech team explored strategies, tools, and methods related to collections of United States newspapers and medical journals. Several collections of digitized newspapers provided resources, but each presented distinctive challenges as well as opportunities: Chronicling America, from the US Library of Congress, provided full text access for free to a substantial collections of daily and weekly newspapers from across the United States. This collection is the best resources for text mining because researchers can access the full text version of all newspaper pages. This resources has two significant limits: first, the OCR included a substantial percentage of errors, which compromise any kind of textual analysis, and second, the available newspapers have limitations by title, region, and population center. Three commercial newspaper collections, Proquest Historical Newspaper, Readex America's Historical Newspapers, and Historical Newspapers from newspapers.com, make it possible to fill in gaps in geographical regions and titles in the Chronicling America collection, but these collections do not provide the text version needed for text mining analysis. These opportunities and challenges required the research team to pursue a variety of strategies, pursue alternative methods, and explore creative solutions.

Medical journals also presented opportunities yet also challenges for the research teams. During the period under study, A large collection of medical journals from this period were identified early in the project, with additional titles added during the course of the research activities. All of these journals were published during the Russian influenza epidemic, and thus directly addressed the key questions about the flow of information about the disease, the dialogue between popular and expert forms of media, and the accuracy of the reports in different forms of publications. The medical journals also presented certain problems, including gaps in coverage (key issues or volumes were missing from digitized collections) and unavailable, incorrect, or inconsistent text versions (although in general the OCR for journals was much better than for newspapers). The relationship between medical journals and popular newspapers was the focus of research, presentations, and publications connected to this project, thus illustrating the value of an integrated approach to using computational methods to understand historical texts and epidemic diseases.

4 Darstellung der erreichten Ergebnisse und Diskussion im Hinblick auf den relevanten Forschungsstand, mögliche Anwendungsperspektiven und denkbare Folgeuntersuchungen

4.1 L3S Research Center

4.1.1 RussianFlu-DE: A German Corpus for a Historical Epidemic with Temporal Annotation



As described above, the first task that necessarily had to be completed was the creation of a corpus containing German and Austrian newspaper articles about the Russian Flu epidemic, published during the relevant time frame when the epidemic took place. The corresponding work, entitled “*RussianFlu-DE: A German Corpus for a Historical Epidemic with Temporal Annotation*”, was published in the 21st International Conference on Theory and Practice of Digital Libraries (TPDL 2017), where it was awarded the best paper award.

The work describes in detail how the data provided by the Austrian National Library (ANNO) in the form of scans of newspaper articles was digitized, cleaned and filtered in order to compile the *RussianFlu-DE* corpus, which only contains articles that are related to the Russian Flu epidemic in German.

The creation of this corpus was done based on the text produced by OCR (automatic text recognition from images) software, which was also provided by the ANNO along with the original scanned images. However, because of the limitations of OCR systems as well as bad quality of the images, the text was very noisy and therefore contained many errors; the word error rate (WER), i.e. the percentage of words that were erroneous, was around 18.9%.

The two most common types of errors were misrecognized words or characters as well as so-called *antistrings*, i.e. words in the image were recognized as a sequence of individual characters by the OCR software due to increased spacing (for example, the word *Influenza* would be recognized as *I n f l u e n z a*). In order to correct these errors, the *Google 2-gram dataset* for German of the years 1885 to 1895 was used. This dataset contains 2-grams, i.e. combinations of any two words, and the associated frequency in which they were used in a given timeframe (in our case 1885-1895). The 2-grams were then used to develop a system for word segmentation (to correct antistrings) and spell checking (to correct misrecognized words). Using these techniques, the word error rate could be reduced down to 5.5%.

After the correction of the OCR text, the resulting blocks of text had to be re-assembled into complete articles (the order of the blocks was often scrambled by the OCR systems). Finally, each article would have to be classified as related or unrelated to the Russian Flu epidemic. The result, a set of complete, corrected articles about the Russian Flu epidemic, would yield the final corpus.

Since the manual classification of each text block would be very time consuming, an approach was developed to automatically pre-classify each text block, assigning it a likelihood score of belonging to a relevant article. The final classification and assembly of the articles was then done manually by human annotators.

In addition to the creation of the corpus itself, all resulting news articles were scanned for temporal expressions, i.e. dates, times, durations and so on. The goal was the annotation and normalization of all temporal expressions in the news articles. The normalization is very important for further analysis, as many temporal expressions are relative; for example, an article might state a day and time relative to the date it was published ("*yesterday evening*"). In order to make statements about the corresponding event, it is necessary to know the absolute date. Thus, the *Heideltime temporal tagger* was used to discover and annotate temporal expressions using the *TIMEX2* schema in a first pass over the articles. Subsequently, the annotations were manually corrected.

For the tasks mentioned above, an annotation framework was developed, including a web-based graphical user interface, that aimed to help the workers during the annotation process. It was published as "*A Framework For Historical Russian Flu Epidemic Exploration From German Newspapers*" in the Digital Humanities (DH) 2017 conference.

In addition to the features described above, namely the collection of the data by querying the database of the ANNO using russian flu related keywords to obtain candidate newspapers, the reduction of noise and correction of OCR errors, the automatic pre-classification of text blocks and the extraction of complete, relevant news articles, it offers a number of analysis tools to be run on the resulting corpus:

1. Geographic and temporal information extraction: All geographic names and temporal expressions can be extracted from the corpus, allowing for an analysis of how the news spread.
2. Indexing and search engine: The corpus was indexed, allowing for easy information access using queries in a search engine.

3. Exploration tools: Several additional exploration tools were developed, namely a timeline to show the number of news articles published about the Russian flu, a tool to analyze frequent patterns of word collocation, and the visualization of the geographic evolution of the reports about the Russian Flu on a map.

4.1.2 Additional Work

The following sections describe additional work that has been done regarding the Russian Flu project, but remains unfinished and/or unpublished so far due to time constraints (the work could not be completed before the project ended).

4.1.2.1 Automatic Assembly of Scanned News Articles

Since the process of manually creating the news corpus as described earlier is very time consuming, efforts have been made to further automate the process, in particular, the task of re-arranging the text blocks in order to obtain the original article. This step is necessary since OCR systems often fail to recognize the structure of the text in a newspaper article, resulting in scrambled words or paragraphs that appear in the wrong order.

Our goal was to automatically detect the separating lines that are often placed between the blocks of text in newspapers. The scanned image could then be sliced into parts along these separators, resulting in much smaller images, where each image contains exactly one text block. Afterwards the OCR algorithm could be run to recognize the text in a single paragraph or coherent text block only, avoiding the problem of losing the order of the paragraphs in the final assembled article.

In order to detect the separators, we subdivided each image (newspaper page) into very small squares (around 100px^2). We then trained a convolutional neural network to classify a square as either “separator” or “no separator”. Using this method, we were able to achieve a pixel-wise accuracy of over 95%. The 5% of the pixels that were misclassified were mostly false positives, where the square contained a letter that was very similar to a horizontal or vertical line (separator). However, these noisy examples could be easily detected and removed, since the surrounding squares are usually classified correctly.

After the detection of the separators and running OCR on the resulting parts, the correct order has to be determined. This may be done by either assembling the paragraphs in the usual order, i.e. top to bottom, left to right, or using another machine learning approach to account for articles that might be arranged in a different way.

4.1.2.2 Automatic Extraction of Relevant Articles from Archived Academic Literature

In addition to newspapers, another source of articles about the Russian flu is academic literature. Similarly to the newspapers provided by the ANNO, the Internet Archive maintains a collection of scanned academic reports, journals and books along with the corresponding OCR data. Creating a corpus from these documents is desirable, as they provide another view on the Russian flu. Since the format of books is inherently clean, the issue of assembling text blocks in the right order, as described above, is non-existent in this case. Instead, there are other issues, for example books that are printed in two columns or contain

advertisements, announcements, or tables within articles. Moreover, the documents contain not only articles about the Russian flu epidemic, but also about other topics, for example diseases in the case of medical literature. As a consequence, the corpus may contain a bulk of content that is irrelevant. Therefore, we focused on the automatic extraction of those articles that are related to the Russian flu. The task requires two steps: firstly, identifying the articles in the documents and creating a dataset out of them, and secondly matching the articles with some keywords related to the Russian flu in order to select relevant articles.

In the first step, we found that a reliable way of identifying a complete article is by taking the content between two headings in the document. A heading may span either a single line or, in rare cases, multiple lines. We solved the problem of identifying the lines which represent headings in the OCR data by leveraging existing works in Information Retrieval using Deep Learning, especially recurrent neural networks, which were trained to detect the isolated characteristics of headings like cases of words and the relation to the content of the main text.

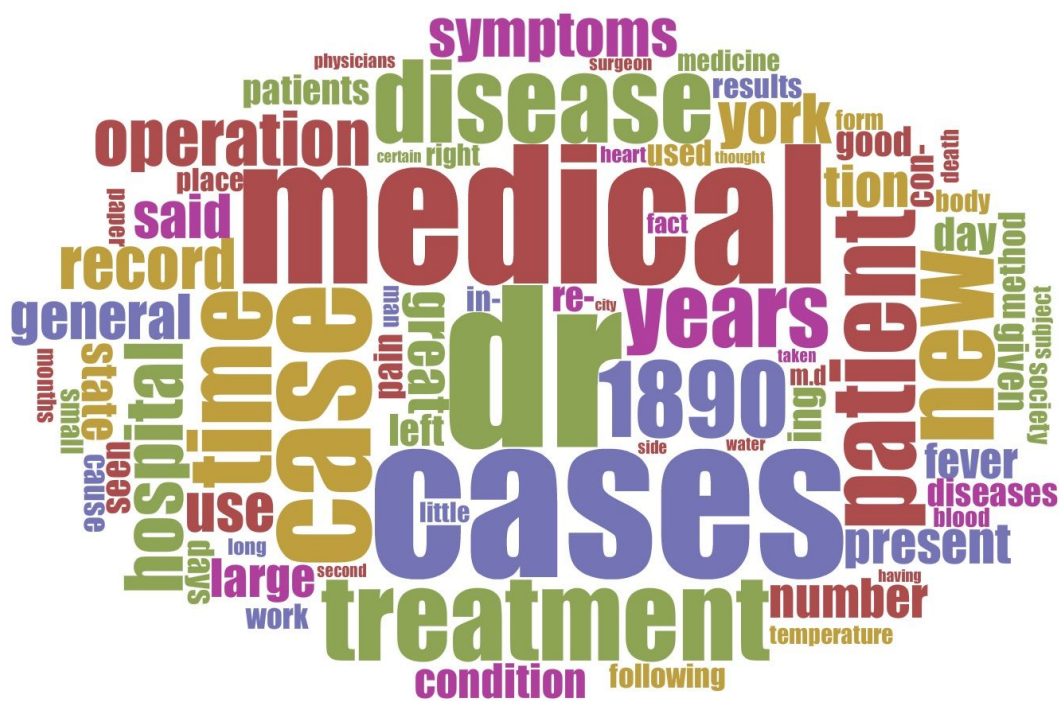
During the experiments, we found that the aforementioned problems in OCR data may affect the identification of headings, for example due to spelling errors or misrecognized tables or figures. Therefore, we employed some additional techniques (n-letter tokenizers, DeepSpelling) to counteract these problems, which improved the precision of the heading detection to 91% on 70 documents with about 80,000 lines of content. Due to the limited time, we were unable to conduct experiments on larger datasets or approach the second step.

4.2 Virginia Tech

In the following, we describe our work on each of the three original research questions. Each section draws upon presentations, publications, and papers, including work completed by student researchers, to identify analysis, issues, and contributions to research Digital humanities and computational analysis.

4.2.1 Tone Reporting

Examining tone reporting is a useful method for studying the history of medicine because it asks how medical experts, physicians, and the public understood the scope and severity of a disease as it was happening. Using newspapers to examine tone reporting makes it possible to track changes in tone over time (daily or weekly) as well as geographic space (using newspapers from multiple locations). Matching tone to chronology and geography is especially important in the case of a global epidemic, as the tone of reporting changes as the disease moves from a distant threat to a local experience.



The tone classification process included the following steps:

1. Identify keywords used frequently and extensively in journal and newspaper reporting on the Russian influenza.
2. Extract text from newspapers in *Chronicling America* which provided extensive and consistent reporting about the influenza in 1889-1890.
3. Use these keywords to extract text located in proximity to combinations of keywords (15 words on either side of the keyword).

The text was extracted in chronological order to allow for tracking change across time. Research assistants coded the sentences according to five categories: *Alarmist*, *Warning*, *Explanatory*, *Reassuring*, and *Unknown*. The classifications were sorted by category and chronologically in order to track changes in tone over time. Using a set of tone classifications as a training set, an automatic classifier was developed to sort text into these categories. Similar steps were implemented for medical journals, to track changes in tone over time and across journal titles. A smaller set of sentences were extracted from German medical journals and newspapers, and were classified according to the same categories. Where possible, classifications for specific cities were matched with death records to determine the tone changes matched with the direct impact of the disease, particularly in the peak months.

During the tone detection, some issues arose, making the process more challenging. Mainly, poor quality OCR data increased the difficulty of classifying sentences confidently by hand, and even more so using the automatic classifier because so many words were misspelled. For example, reading 30 word phrases, rather than complete sentences, meant that classification was partial and sometimes incomplete. But even for examples with good quality OCR text, the classification by hand was a slow process, requiring close reading. Tone classification required judgments by trained students, yet even here disagreements

emerged during the classification process. Additionally, a high proportion of medical journal texts were classified as explanatory, which raised questions about the utility of this process. For the automatic classification approach, larger training sets would have increased the accuracy of the automatic classification system across more newspaper and journal texts.

In summary, the tone of newspaper reporting included more warning and alarmist tones as the influenza was perceived as more of a health danger and as the epidemic moved from a distant disease to an immediate threat. However, even at the peak of the epidemic, examples were located of explanatory and even reassuring tone, despite the increased number of cases and deaths. Extending these steps to more newspapers and journals will allow for a more comprehensive examination of the relationship between tone reporting and disease outbreaks.

4.2.2 Narrative of the Outbreak in Journals and Newspapers

Tracking the Russian flu includes geographic spread, chronological sequence, and genre of reporting. By examining newspapers in different locations at different times, this project tracked the reporting on the disease as it happened, with journalists, editors, and headline writers contributing to an emerging narrative of the disease. Medical journals also contributed to this narrative by publishing expert analysis of the disease, but also republishing reports, articles, and statistics from other medical journals. Research on this question included the following case studies of how newspapers and journals presented of a narrative of disease:

- Prominent doctors whose statements were reprinted in newspapers: articles about Bartholow, Shrady, and Zdekauer
- Differences in analysis between medical journals and popular newspapers
- Role of journalists in reporting on the Russian influenza: Washington Evening Star case study
- Newspapers, medical journals, and health reports on number of cases and deaths: case studies of Berlin, Indiana, Connecticut, and Washington DC
- British Medical Journal: reporting on the Russian flu using multiple methods

4.2.3 Accuracy of Predictions

Newspapers and medical journals frequently speculated about the course of the disease. These predictions often began with confident and reassuring statements that influenza was not a serious threat to public health, yet as the number of cases and especially deaths increased, medical experts acknowledged a more significant threat to public health. Although the number of cases was much higher than predicted, the fatality rate among those who fell ill with influenza remained relatively low.

In summary, the analysis yielded the following insights:

1. Expert recommendations published in medical journals were widely publicized in newspapers and this circulated to a broader public audience.
2. Medical journals and doctors criticized newspapers for spreading exaggerated reports and fostering anxiety among patients and the public.

3. Doctors' perceptions of the influenza epidemic were shaped by their training, work with patients, reading of medical literature, and public awareness.
4. Newspapers and medical journals underestimated the extent of cases, and responded when the disease became more widespread than expected.
5. The number of deaths did not significantly exceed expectations, except for short periods (one to three weeks) which attracted considerable attention in newspapers.

5 Stellungnahme, ob Ergebnisse der Vorhaben wirtschaftlich verwertbar sind und ob eine solche Verwertung erfolgt oder zu erwarten ist. Ggf. Angaben zu Patenten, Industriekooperationen o.ä.

This project has used open access data, tools, and resources as much as possible and makes the analysis open to researchers and students. Examples of open access resources include newspaper collections from the Austrian National Library (ANNO), the United States Library of Congress (Chronicling America), and German newspapers from various libraries. The project has also used some commercially available databases, including the Proquest and Newsbank collections for the United States and the British Newspaper Archive for the US. These databases were used to fill important gaps in coverage. Medical journals are publicly available through the Medical Heritage Library and the Internet Archive in multiple formats including pdf versions of the original publication format and text versions from OCR. In some cases, journals were acquired from Hathi Trust, using library subscriptions, to fill gaps. The use of publicly accessible databases were a deliberate strategy to ensure that the research steps could be pursued by other scholars and students without needing to purchase access or data collections.

As much as possible, the results of this research are also made publicly available. The journal articles published in Current Research in Digital History and Medical History are open access to all. The papers available from Circulating Now at the US National Library of Medicine and the Medical Heritage Library are open access and available to anyone. Finally, most of the presentations for this project are posted online and can be accessed by anyone. These steps ensure that research outcomes, as well as the process described in articles, papers, and publications, can be readily accessed by scholars and the public.

6 Wer hat zu den Ergebnissen des Projekts beigetragen (Kooperationspartner im In- und Ausland, Projektmitarbeiter/innen usw.)

- L3S Research Center, Leibniz Universität Hannover
 - Tran Van Canh (from 01.04.2016 to 31.10.2017)
 - Jurek Leonhardt (from 01.01.2018 to 31.05.2018)

- Vo Duy Khoi (from 01.01.2018 to 31.05.2018)
- Department of History; College of Liberal Arts and Human Sciences, Virginia Tech
 - Co-Principal Investigators:
 - Tom Ewing, Department of History
 - Amy Nelson, Department of History
 - Aditya Prakash, Department of Computer Science
 - Graduate Research Assistants: Sorour Ekhtiari Amiri, Earl Cherry, J. B. Potter, Heather Ryan
 - Undergraduate Student Researchers: Alexis Abraham, Carolyn Carrithers, Deepika Darivemula, Vini Dhindsa, Sinclair Ewing-Nelson, Sage Foh, Ian Hargreaves, Veronica Kimmerly, Vijay Kuruvilla, Allison Hurley, Ashley Ireland, Jessica King, Haitham Mawari, Nicholas Mahfoud, Brett Newman, Emily Oliver, Veronica O'Rourke, Jay Pandya, Andrew Pregnall, Madison Rawles, Tyler Talnagi, Crystal Valesco, Grayson van Buren, & Brock Wolf

7 Qualifikation des wissenschaftlichen Nachwuchses im Zusammenhang mit dem Projekt (z.B. Diplome, Promotionen, Habilitationen usw.)

- Moritz Gutt: Tracking Russian Flu from German Newspapers (Bachelor thesis)